DOCTORAL STUDENTS' CAREER DECISION-MAKING PROCESS: COMPARING FACULTY AND NON-FACULTY CAREERS FROM SOCIO-COGNITIVE AND CONTEXTUAL PERSPECTIVES

BY

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DISSERTATION

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ABSTRACT

Minimal extant research on doctoral students' career development prohibits the customization of career preparation that is necessary to prepare them with competencies for achieving their career goals. Such research is particularly urgent as current academic job markets shift career placement patterns of doctoral recipients. This study addresses this need using mixed methods to investigate how doctoral candidates determine their career choices based on their sought career paths. Using Cognitive Information Processing (CIP) and Social Cognitive Career Theory (SCCT) as theoretical frameworks, the study sought to 1) understand doctoral students' career choice processes and 2) examine the career decision-making process differences based on their sought career paths (faculty versus non-faculty route). This exploratory study was conducted at a large, public, and research-oriented U.S. Midwestern university (USMU). Purposive sampling strategy was adopted by targeting "all-but-dissertation" (ABD) doctoral students regardless of affiliated discipline.

This study employs a convergent parallel design mixed methods approach. SCCT guided quantitative research A total of 372 doctoral candidates responded to the survey, and analysis of covariance was conducted to identify group differences in the effects of environmental influences on their career choice process. Concurrently, structured interviews with 30 doctoral candidates were conducted to deeply understand their career decision-making processes step by step. The interview protocol was developed based on CIP theory and directed content analysis guided qualitative data analysis Finally, a joint matrix was used to merge these two data sets to identify overlapping and different facets of doctoral students' career choice processes through triangulation. Several implications of these findings, limitations of the study, and suggestions for future research are discussed.

Keywords: doctoral students, knowledge workforce, career decision-making process, faculty career and non-faculty career paths, and post-graduate career choice

DEDICATION

I dedicate this dissertation to my parents (Youngdae Seo and Sooyeon Park), my husband (Honghui Shi), and my baby (Honey-B). Thank you for all of your infinite support and love.

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Chapter 1

Introduction

In today's knowledge-based society, innovations driven by knowledge are considered the most strategically critical resources to contribute to economic development (Bartlett & Goshal 2002; Carleton, 2011; Dubina, & Carayannis, & Campbell, 2012). Due to the importance of knowledge as a resource for creating value (Banejee & Morley, 2013; Drucker, 1992; O'Driscoll, 2003), emphasis has shifted from tangible to intangible resources such as human capital, especially knowledge workers who apply, adapt, synthesize, and generate knowledge and ideas to solve problems and innovate (Carleton, 2011; Dubina et al., 2012; Lehmann, 2009; Lei, & Hu, 2015). The knowledge workforce is an increasingly influential factor on economic growth (Nerad, 2010, 2011; Paré, Starke-Meyerring, & McAlpine, 2011) as "future economic performance will be closely based on the skill and innovation level of the labor force, underpinned by effective research and R&D capacity" (Harman, 2002, p. 179).

As further economic growth is essentially based on developing a knowledge workforce who can facilitate sustainable knowledge development (Nerad, 2010; Paré et al., 2011; Usher, 2002), universities and colleges are primary agents to produce and develop the knowledge workforce, especially through doctoral education (Adler & Harzing, 2009; Nerad, 2011; Ruth & Tan, 2011). Doctoral education is an essential place where novice doctoral trainees learn to become proficient in producing, transforming, and distributing disciplinary knowledge for society's application (Rudd & Nerad, 2015; Wendler, Bridgeman, Markle, Cline, Bell, McAllister, & Kent, 2012).

Studies of doctoral education repeatedly found that doctoral students serve a significant purpose in producing knowledge (Slaughter, Campbell, Holleman, & Morgan, 2002; Stephan,

Sumell, & Black, 2004; Thune, 2009). Doctoral students' achievements also benefit the reputation of a university (Stephan et al., 2004) and are a primary vessel to transfer knowledge between academia and industries (Thune, 2009; van der Haert, Ortiz, Emplit, Halloin, & Dehon, 2014). Such student population becomes advanced knowledge producers or innovators through the process of designing and executing research independently with an in-depth understanding of discipline-specific knowledge (Lee, Miozzo, & Laredo, 2010). Thus, doctorate holders are viewed as the future generation of advanced knowledge workers and a foundational part of the complex contemporary knowledge environment where a strong need for researchers exists to continue economic development through applicable innovations (Enders 2004; Most, 2008; Nerad, Rudd, Morrison, & Picciano, 2007; Rudd & Nerad, 2015). In this manner, higher education institutions, especially doctoral education where tomorrow's knowledge professionals are developed (Nerad, 2010; Neumann & Tan, 2011), play an important role as an integrated part of economic and workforce development strategies (Nerad, 2011; Ruth & Tan, 2011; Wendler et al., 2012).

Given the increasing importance of doctoral degree holders in society (Allum, Kent, & McCarthy, 2014; Van der Haert et al., 2014; Wendler et al., 2012), policy makers, educational researchers, and administrators of higher education have assessed doctoral programs' effectiveness as well as doctoral student outcomes over time (Denecke & Slimowitz, 2004; Gardner, 2009; Monk & Solem, 2015; Most, 2009). Significantly, a growing body of research has provided empirical support for understanding how doctoral students successfully navigate a doctoral program to completion (West, Gokalp, Pena, Fischer, & Gupton, 2011).

Existing literature on doctoral students often focuses on factors that impact students' decisions to pursue doctoral education (Dabney & Tai, 2014; Heller, 2001; Jisha, 2004; Perna,

2004; Talbot, 1996), factors that influence doctoral degree completion (Ampaw & Jaeger, 2011; Baird, 1997; Grove, Dutkowsky & Grodner, 2007; Most, 2008; Wao, 2010; West et al., 2011) and retention (Ali & Kohun, 2006; Ampaw & Jaeger, 2011; Di Pierro, 2012), or the role of advisors and its relationship with doctoral students (Baird, 1995; Morrison & Lent, 2014; Schlosser & Gelso, 2001).

Although extant literature offers advancements for predicting factors that enable doctoral students to successfully accomplish their doctoral training, career development needs for success in obtaining careers in their respective fields after the completion of doctoral education has been neglected by research (Fuhrmann, Halme, O'Sullivan, & Lindstaedt, 2011; Rudd, & Nerad, 2015; Ruth & Tan, 2011; Thune, 2009) in spite of a recent critical workforce misalignment in labor markets for doctoral degree holders (Monk, & Solem, 2015; Nerad 2004; Rudd & Nerad, 2015; Ruth & Tan, 2011).

According to the Survey of Earned Doctorates (SED) in 2013, a total of 52,760 research doctorate degrees were awarded by 421 U.S. institutions, which is the highest number ever informed by the SED. This represents a 3.5% growth from 50,977 in 2012 and 7.9% growth from 48,903 in 2011 (Lederman, 2014; SED, 2013). Despite this rising trend of overall doctoral educational achievements, tenure-track faculty positions in the academic sector have not increased proportionally to the number of graduated doctoral students (Curtis, 2013; Fuhrmann et al. 2011; Gibbs & Griffin, 2013). According to the American Association of University Professors (AAUP), a total number of tenure-track faculty positions only increased by 1.1% from 134,826 in 2007 to 136,320 in 2011 (Curtis, 2013) as a result of institutions' increasing reliance on non-tenure-track faculty appointments (Carlucci, 2013; Cross & Goldenberg, 2009; Laurence, 2014). In other words, only 1,494 tenure-track faculty positions were available over a period of

five years (Curtis, 2013) while there were 243,400 doctoral degrees awarded during the same period (SED, 2013). This supply-demand gap continues to grow every year (Fuhrmann et al. 2011; National Research Council [NRC], 2011; Teitelbaum, 2008).

The consequences of this mismatch between the supply of doctorate holders seeking a traditional career and the demand for such positions have made doctoral holders' career paths less straightforward (Laurence, 2014; Wendler et al., 2012). Traditionally, and also stereotypically, earning a doctoral degree leads to an academic faculty career (Jones, 2003; Rudd & Nerad, 2015; Thune, 2009) since the doctoral degree is the only academic degree qualified to enter tenure faculty positions in universities (Pearson, Seccombe, Pike, & Connor, 1993; Rudd & Nerad, 2015; Thune, 2009). Therefore, a doctoral education is often considered the quintessential preparation for a faculty career, and many graduating and graduated doctoral students tend to regard a faculty position in academia as their immediate career goal (Curtin, Malley, Stewart, 2016; Wang, Lo, Xu, Wang, & Porfeli, 2007). However, an increasing number of doctoral students and graduates have pursued non-faculty career paths (Enders 2005; Fuhrmann et al. 2011; Thune, 2009) as doctoral recipients outnumber the availability of academic positions (Allum et al., 2015). Moreover, the proportion of doctoral students pursuing non-faculty careers is likely to continue to grow (Fuhrmann et al., 2011). As such, doctoral education is no longer considered a primary place to train students as the next generation of faculty because non-faculty career paths have become more than an "alternative" choice (Enders 2004; Gemme & Gingras, 2012; Nerad 2009; Wendler et al., 2012).

Besides the United States, an increasing body of doctoral degree holders in other countries such as UK, France, and Spain also obtains jobs outside of a college or university teaching and research careers (Auriol 2007; Beltramo, Paul, & Perret, 2001; Lee, Miozzo, &

Laredo, 2010). This phenomenon does not imply that all PhDs must pursue a non-faculty career in the future, but it nevertheless emphasizes the importance of understanding in greater detail the pursuit of non-faculty careers together. As such, we may comprehend a broader knowledge of the overall career development processes of PhD holders. In this way, academic communities will be able to provide support systems tailored for individual PhD trainees to achieve their sought post-graduate careers regardless of whether they pursue faculty or non-faculty jobs.

Notably, doctoral students expressed that they rarely received accurate or adequate career service guidance and information during their doctoral education (Allum et al., 2014; Fuhrman et al., 2011; Gibbs & Griffin, 2013; Wendler et al., 2012). According to the recent Council of Graduate School (CGS) student survey, 54% of currently enrolled doctoral students and those who recently earned a doctoral degree indicated that they received less resources and information on how to prepare for their upcoming careers after graduation even when compared with the time before entering a doctoral program (Wendler et al., 2012). These findings underscore the fact that minimal information is known about doctoral students' career-related experiences, especially with regard to why and how they make a career choice and what career development assistance they need for their career pursuits.

Statement of the Problem

The fundamental misalignment between doctorate holders seeking faculty positions and the availability of such positions (Carlucci, 2013; Fuhrmann et al. 2011; Rudd & Nerad, 2015) has shifted doctorates career placement patterns. Thus, current doctoral students need to prepare for a variety of careers beyond a faculty career path (Nerad, 2010), which in turn requires more diverse competencies and experiences that were not traditionally developed or emphasized in doctoral education (Lee et al., 2010; Nerad, 2010; Rudd et al., 2008).

To facilitate continuous knowledge creation inside and outside of academia (Thune, 2009) and to expand the future talent pool to meet the demands of an innovation-driven contemporary economy (Most, 2008; van der Haert et al., 2014), Human Resource Development (HRD) scholars and practitioners need to consider higher education as one of areas of human resource development (e.g., Doloriert & Sambrook, 2012), especially doctoral education where a large number of a future knowledge workforce are developed (Nerad, 2010; Neumann & Tan, 2011). However, minimal research in HRD aims to understand how to best train and develop this particular future workforce to ameliorate the fundamental misalignment between the doctorate holders seeking faculty positions and the availability of such positions. Rather, the majority of work has been focused on understanding how to attract or retain knowledge workers within the organizations (e.g., Carleton, 2011; Doh Smith, Stumpf, & Tymon, 2011; Yigitcanlar, Baum, & Horton, 2007).

Despite concerns resulting from the consequence of changes in doctoral students' career patterns and the importance of doctoral students' career preparation mentioned thus far, specific career development needs and concerns of doctoral students are scarce from current scholarly and administrative discussions of student development (Gardner, 2009; Ruth & Tan, 2011). A few studies investigating PhD graduates' career-related experiences found that doctoral students' experiences, especially with their faculty advisor, during a doctoral program significantly influenced their career paths (Curtin et al., 2016; Dabney & Tai, 2013) and career decision making was an outcome of socialization during doctoral program (Austin, 2002; Fuhrmann et al., 2011). Nevertheless, minimal insight exists as to how doctoral students make post-graduate career choices and establish career prospects, due to the scarcity of research examining doctoral students' career-related experiences (Wendler et al., 2012).

This lack of understanding on doctoral students' career development prevents doctoral students, faculty, career professionals, and administrators in higher education institutions from providing customized career development preparation to equip doctoral students with information and competencies necessary to pursue their post-graduate career goals (Lee et al., 2011; Wendler et al., 2012). Although several institutions recently set doctoral students' career preparation as a priority task, the challenges confronting many of today's doctoral students and graduates remains complex and ill-defined, especially for doctoral students at research-intensive universities where the largest numbers of doctoral degree holders are produced (Wendler et al., 2012). Therefore, more studies need to be conducted in an effort to guide doctoral students' career development processes and develop career interventions for their future success.

A more comprehensive understanding of the dynamic mechanisms through which individuals make and implement their career choices to pursue a faculty or non-faculty career is needed to develop and provide meaningful and helpful career interventions for doctoral students. The question remains, what do doctoral students actually experience when making their post-graduate career choices to pursue a faculty or non-faculty career, respectively? Also, given their sought career paths, how do doctoral students perceive their environment in ways that may help or hinder the course of their career development? Other questions include: How do doctoral students perceive a career prospect based on a sought post-graduate career? What differences and similarities are identified in experiences based on post-graduate career goals? Where and when do career interventions require more adequate guidance for doctoral students based on their career interests, regardless of the career paths that they pursue, so that academic communities are prevented from underutilizing these skilled and talented people rather than being concerned about whether universities overproduce PhDs?

Purpose of Study

The purpose of the study is twofold. First, this study sought to understand the career decision-making processes of ABD doctoral students. Second, this study aimed to examine the differences in doctoral students' career decision-making processes based on their sought career paths. Specifically, it compared career decision-making processes between those who decided to pursue faculty career paths (faculty career group) and those who decided to pursue non-faculty career paths (non-faculty career group) after graduation.

To achieve its aims, this study compared the career decision-making process of each group by examining the internal cognitive process. Based on an in-depth understanding of their internal career decision-making process, factors that influenced their post-graduate career decision processes to pursue both faculty and non-faculty careers are also explored. In addition, this study examined contextual influences and differences in perception, including expected environmental supports and barriers, beliefs in one's abilities to make a career decision, and expected career outcomes based on career path sought (faculty route versus non-faculty route). Such examinations contributed in an effort to identify differences across these two groups as regards individual perceptions during the career decision-making process.

A purposive sampling strategy was adopted in the study since the chosen included people of interest and excluded those who do not suit the purpose of the study. Considering that research-oriented universities serve the most critical role in educating doctoral students (Allum et al., 2014), the population of this study consisted of doctoral students who study at a research-oriented university. At this particular university, around 100 doctoral degrees in a variety of different disciplines are granted. Specifically, those candidates who have passed the preliminary exam and were in the ABD stage of doctoral programs were invited to participate in this study.

The reason for this population selection was because doctoral students in the ABD stage often start to enter the job market (Duncan, Yandell, & Doshi, 2000; Gardner, 2009; Vanevenhoven, Delaney-Klinger, Winkel, & Wagner, 2011) to acquire either faculty or non-faculty positions. Therefore, they might be considered as "job seekers" who experienced the career decision-making process and decided which post-graduate career path to pursue. Moreover, participants of this study included all doctoral students in the ABD stage, regardless of disciplines that they are affiliated.

Theoretical Frameworks

Sampson, Reardon, Peterson, and Lenz's (2004) Cognitive Information Processing (CIP) theory and Lent, Brown, and Hackett's (1994) Social Cognitive Career Theory (SCCT) provided theoretical foundations for the current study. The CIP theory and SCCT are considered effective theoretical frameworks for examining the processes through which people make and pursue career choices (Ali & McWhirter, 2005; Bullock-Yowell, Katz, Reardon, & Peterson, 2012). Each approach presented different aspects of the career decision-making process, and together, they offered a comprehensive view of career decision-making processes.

The CIP theory provided a theoretical framework for understanding individuals' cognitive and behavioral factors that help them to make a career decision (Peterson, Sampson, & Reardon, 1991; Sampson et al., 2004). Further, the CIP theory provided an internal structure and process for understanding how an individual gathers, transforms, and applies information to make a career decision while emphasizing the importance of an individual's thoughts and feelings during this process (Bullock-Yowell, et al., 2012; Sampson et al., 2004). This process involves a five-phase cycle of communication, analysis, synthesis, valuing, and execution (the CASVE cycle) to process information about career decisions (Sampson et al., 2004). Employing

the CIP theory, this study explored the internal cognitive process to make a career decision. It helped to identify factors influencing the career decision-making processes to pursue faculty and non-faculty careers.

In addition to the cognitive aspects of the career choice process, SCCT examined individuals' perceptions toward environmental factors, such as contextual barriers and supports that help or hinder career decision-making processes (Lent et al., 1994, 2000). SCCT is considered a promising approach for understanding the effect of proximal environmental forces (e.g., career-related barriers and supports) on an individual's career decision-making process (Lent & Brown, 2013; Lent, Brown, Schmidt, Brenner, Lyons, & Treistman, 2003; Swanson, Daniels, & Taylor, 1996). Through the lens of SCCT, this study sought to understand the role of perceived environmental influences to the career decision-making processes. Detailed information about the theory integration is available in Chapter 2, "Theory integration of CIP theory and SCCT."

Research Questions

In order to achieve the purpose of the study, the following research questions and sub-questions served as a guide:

1. Given the theoretical grounding of SCCT, are there significant differences in ABD doctoral students' belief in their own abilities to make a career decision, and expected career outcomes, and perceived environmental supports and barriers to pursue their sought careers based on their sought career paths after adjusting effects of distal contextual variables?

- Are there differences in career decision-making self-efficacy based on their sought career paths (faculty career and non-faculty career) after adjusting effects of distal contextual variables?
- Are there differences in expected career outcomes based on their sought career paths (faculty career and non-faculty career) after adjusting effects of distal contextual variables?
- Are there differences in perceived environmental barriers and supports based on their sought career paths (faculty career and non-faculty career) after adjusting effects of distal contextual variables?

2. What are ABD students' internal cognitive processes, guided by CIP theory's CASVE cycle, for deciding to pursue a faculty or non-faculty career, respectively?
   - What similarities and differences are identified based on their sought career paths?
   - What are the factors that influence the post-graduate career decision-making process to pursue faculty or non-faculty careers, respectively?
3. In what ways and to what extent do the findings of the quantitative data guided by SCCT and findings of the qualitative data guided by the CIP theory empirically converge and diverge to contribute to a comprehensive and nuanced understanding of the career decision-making processes of ABD doctoral students considering different career paths?
   - In what ways and to what extent do environmental barriers and supports, career-decision self-efficacy and career outcome expectations derived from SCCT relate to each phase of the CASVE cycle?

        - What similarities and differences are identified based on their sought career paths?
    - In what ways and to what extent do the identified patterns of environmental barriers and supports as well as self-efficacy and outcome expectations within the CASVE cycle explain the findings of the quantitative data guided by SCCT in this study?

Research Approach

To address these three major research questions, a mixed methods approach was employed to examine the differences in the career decision-making processes of ABD doctoral students based on their sought post-graduate career paths. This study applied the convergent parallel design (Creswell, 2014), which involved separately collecting and analyzing both quantitative and qualitative data. Then, the study merged two set of findings to facilitate an examination of the ways that they converge and diverge to develop a more complete and valid understanding of the phenomenon being researched (Creswell & Plano Clark, 2011; Greene, 2007). This approach elucidated the internal and external aspects of ABD doctoral students' career decision-making processes based on different career paths.

The quantitative (survey) and qualitative (interview) data were collected separately to answer the proposed research questions. However, participants of the survey were only invited to participate in the interviews in order to obtain the two strands of data collected from similar participants (Creswell, 2014). A purposive sampling strategy was adopted to invite ABD doctoral students. The collected data were categorized into a group of ABD doctoral students who were pursuing a faculty career as a post-graduate career choice (faculty career group) and a

group of ABD doctoral students who were pursuing a non-faculty career after graduation (non-faculty career group).

In response to the first research question, previously developed and established survey instruments were employed to collect responses from ABD doctoral students. To examine the significant differences in the self-efficacy, career outcome expectations, and perceived environmental supports and barriers between doctoral students' sought career paths (faculty route versus non-faculty route), the collected responses were analyzed by using a one-way analysis of covariance (ANCOVA). ANCOVA is often used to identify differences among groups by reducing the within-group error variance (Leech, Barrett, & Morgan, 2005). This statistical analysis was appropriate for comparing differences in ABD doctoral students, primarily based on their sought post-graduate career paths. Age, gender, ethnicity, citizenship (domestic or international), marriage/civil partnership status (single or married/partner), and fields of disciplines (fields of science and engineering and fields of social science and humanities) were used as covariates to control within-group error variance. More information regarding the criteria to select the above variables as covariates is available in Chapter 3.

The survey instruments chosen for responding to the first research question were the Career Decision Self-Efficacy Scale-Short Form (CDSE-SF, Betz, Klein, & Taylor, 1996; Betz & Taylor, 2006), the Vocational Outcome Expectations (VOE Scale, McWhirter, Rasheed, & Crothers, 2000), Contextual Barriers and Supports (Lent et al., 2001), and one subscale of the Advisory Working Alliance Inventory-Student (AWAI-S Scale, Schlosser & Gelso, 2001).

The CDSE-SF scale contains 25 items with a 5-point scale measuring participants' degree of belief in accomplishing tasks necessary to make career decisions (Betz & Taylor, 2006). The CDSE-SF scale addresses aspects of the career decision-making process and plays a critical role

in various career behaviors (Choi, Park, Yang, Lee, Lee, & Lee, 2012). According to Betz, Hammond, and Multon (2005), internal reliability scores of 5 sub-scales ranged from .78 to .87. The VOE (McWhirter et al., 2000) consists of six items that assesses the degree of individual beliefs about the outcomes of various courses of action, regarding a selected career choice. The coefficient of reliability of VOE scale was reported as .83 (McWhirter et al., 2000) to .85 (Kenny, Blustein, Chaves, Grossman, & Gallagher, 2003). A five-point Likert scale is provided for all items with response options ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate stronger career outcome expectations. The CDSE and the VOE theoretically and empirically examine the significant influence on individual's choice, actions, persistence, and performance (Bandura, 1997; Betz & Taylor, 2006; Choi et al., 2012; Lent et al., 1994; Lent et al., 2003).

The Contextual Barriers and Supports (CBS) was created by Lent et al. (2001) to assess the degree with which participants perceive the likelihood of experiencing barriers and supports. Using a 5-point Likert scale from 1 (not at all likely) to 5 (extremely likely) allows participants to indicate how likely they would be to experience each of the 15 supports (e.g., "have access to a 'mentor' who could offer you advice and encouragement") and 21 barriers (e.g., "receive unfair treatment because of your gender") if they pursue their chosen career path. Lent et al. (2001) reported that the barriers and supports measures yielded adequate internal consistency reliability estimates, .90 and .88 respectively. In addition, coefficient alpha values reported by Lent et al. (2003) for the barriers and supports scales were, respectively, .94. and .92.

Recognizing the importance of a supportive relationship between a doctoral student and her or his advisor on the graduate student' academic and professional development (Barnes & Austin, 2008; Gelso & Lent, 2000; Morrison & Lent, 2014; Schlosser & Gelso, 2001), one

subscale of the AWAI-S scale was added in this study as another environmental support component to capture the unique situation of doctoral students. Originally, the AWAI-S scale measured an advisee's perceptions of the working alliance with his or her advisor. This study only selected *Rapport* subscale (11 items) because this subscale was considered the most critical factor among the AWAI scale in creating a positive working alliance between an advisor and a doctoral student (Schlosser & Gelso, 2001). Rapport suggests a critical part of the advising relationship reflecting the faculty advisor's encouragement and supports of the doctoral advisee (Schlosser & Gelso, 2001). The empirical study (Schlosser & Gelso, 2001) also demonstrated that the rapport subscale demonstrated the highest positive correlation with advisee's self-efficacy (rapport, $r = .36$; apprenticeship, $r = .29$; identification, $r = .20$; $ps < .001$). Higher scores indicate that the advisee is more likely to feel encouraged and respected and supported by his or her advisor (Schlosser & Gelso, 2001), which can be conceptualized as environmental supports for doctoral students. The internal consistency reliability coefficient of Rapport subscale was reported .93 by Schlosser and Gelso (2001).

The second research question was addressed in the context of one-to-one structured interviews. A total of 30 ABD doctoral students (15 for the faculty career group and 15 for the non-faculty career group) were interviewed to explore internal career decision-making processes, which are guided by the CIP's CASVE cycle. Data collected from both groups were analyzed using directed content analysis (DCA, Hsieh & Shannon, 2005). The CASVE cycle provided a theoretical grounding to 1) develop interview questions, 2) create the initial coding category, and 3) guide the interpretation of findings. Additionally, this study examined whether there are any differences in their processes by group.

To address the third research question, the overarching mixed question (Creswell, 2014; Tashakkori & Creswell, 2007), the two strands of data (interviews and surveys) were interacted to gain a more complete and valid understanding of the career decision-making process of doctoral students as a result of triangulation (Creswell, 2014; Greene, 2007). Specifically, the qualitative data were re-examined by using a joint matrix developed with SCCT constructs employed in the quantitative research as a thematic analysis guide to identify environmental barriers and supports as well as socio-cognitive variables that are implicit in the CASVE decision-making cycle. The complete joint matrix was used to identify overlapping and different facets through a comparison with the quantitative data findings.

Table 1.1 shows the correspondences of the research questions, data sources, and analysis procedures that were used in this study. More detail regarding the research procedures is available in Chapter 3.

Significance of the Study

This study aimed to understand the processes through which doctoral students determine post-graduate career decisions. To gain such knowledge, this project focused on students' career decision-making processes step-by-step, from their own points of view, as a way of examining differences among career decision-making processes, based on particular career choices. In addition, this study clarified differences among perceived environmental influences, career decision self-efficacy, and career outcome expectations, that were implicit in the CASVE decision-making cycle, based on doctoral students' sought career paths. This study examined the types of environmental and social cognitive factors that affect career decision-making processes at various stages. Also, it aided in the recognition of differences that exist between doctoral

students based on their sought careers. This emphasis, in turn, assisted in identifying where and when doctoral students would benefit from more career guidance based on their sought careers.

Table 1.1

Alignment of Research Questions, Data Sources, and Analysis Procedure

Research Question (RQ)	Data Sources	Analysis Procedure
RQ 1 Given the theoretical grounding of SCCT, are there significant differences in ABD doctoral students' belief in their own abilities to make a career decision, and expected career outcomes, and perceived environmental supports and barriers to pursue their sought careers based on their sought career paths after adjusting effects of distal contextual variables	Data from close-ended, pre-established measurements via online surveys (Quantitative data)	Descriptive statistics to understand participants' characteristics and inferential statistical procedure (ANCOVA)
RQ2. What are ABD students' internal cognitive processes, guided by CIP theory's CASVE cycle, for deciding to pursue a faculty or non-faculty career, respectively?	Data from one-to-one semi-structured interviews (Qualitative data)	Directed content analysis guided by the CIP's CASVE decision-making cycle, frequency of codes analysis, and independent sample t-test to compare differences
RQ3. In what ways and to what extent do the findings of the quantitative data guided by SCCT and findings of the qualitative data guided by the CIP theory empirically converge and diverge to contribute to a comprehensive and nuanced understanding of the career decision-making processes of ABD doctoral students considering different career paths?	Merging the two sets of data that were collected to answer the two prior research questions	Re-examine qualitative data as guided by SCCT to relate to findings of the quantitative data by using a joint matrix, frequency of codes analysis and independent sample t-test to compare differences (Triangulation)

Findings of this study offered a starting point to inspire more diverse dialogues to address an aspect of doctoral students' wide-spread concerns (Barnes & Austin, 2009). Specifically, this study provided empirical foundations for graduate career professionals, faculty, and administrators to investigate how to create appropriate and effective opportunities that would encourage doctoral students to make more informed post-graduate career decisions based on their career interests. Consequently, doctoral students may engage in various learning opportunities and career interventions in the early stages of their graduate work to prepare for a successful transition from the role of student to professional. Eventually, this practice might enable doctoral graduates to maximize their abilities in the workplace as advanced knowledge workers while answering an evident need for knowledge workers to advance today's knowledge economy (Nerad, 2010).

Further, building upon well-established and career-related theoretical frameworks, such as SCCT and CIP theory, this study expanded theoretical understandings of how an individual made a career choice from both socio-cognitive and contextual perspectives. Exploring each decision-making step, derived from the CASVE decision-making cycle, can extend the potential usage of CIP theory's application in research. Grounded in SCCT, this study assessed differences in variables associated with the career choice process by using the standardized instruments. Examinations of these variables made the extension of previous studies on doctoral students' career development as it connected the findings of this study with previous literature, thus resulting in a more comprehensive understanding based on empirical and theoretically grounded insights.

Finally, a mixed methods research design was used in this study to develop a "broader, deeper, and more comprehensive social understanding" (Greene, 2007, p. 101) of doctoral

students' career decision-making process. This illuminated the complex interactions that existed between cognitive and contextual factors during the career choice process.

Operational Definitions of Terms

A number of major terms used in this study contain various definitions. This section provides operational definitions to specify their meaning within the context of this study.

Career. In this study, the term *career* is understood as "the course of one's vocational behavior" (Savickas, 2002, p.152) as he or she selectively and actively engages in a variety of vocational activities for his or her own development throughout the life span. Although the term, career often broadly includes any chosen activities that an individual is engaged with to achieve his or her own developmental purpose, such as educational, occupational, leisure, and volunteer activities, this study mainly focused on individual occupation-related perceptions and choices to achieve the purpose of the study.

Career decision-making process. Grounded in Sampson et al.'s (2004) CASVE cycle and Lent's et al.'s (1994) SCCT, the phrase *career decision-making process* is considered as a lifelong process that continuously evolves over a certain time period, rather than as a one-time event. This process is understood as a sequence of key steps that allows individuals to explore career options, select a primary option, and develop a plan of actions to pursue a career decision that is made during the process. Perceived outcomes of actions (e.g., success, failure) prompt individuals to modify or change their original intention or goal. In addition to their cognitions and emotions, individuals' interactions with environmental influences (e.g., significant others) also influence their perceptions, resulting in hindrances or facilitations of this process.

Career decision. A career decision is a choice that an individual decides to pursue a certain occupational option. For the purpose of this study, educational choice or goal (e.g., decision a major) was not considered.

All-but dissertation (ABD). ABD indicates a certain stage in the process of pursing a doctoral degree in the U.S. higher education institution. ABD doctoral students are those who completed all required coursework, passed a qualifying examination, and passed preliminary exam, but are working on the proposed dissertation (e.g., collecting or analyzing data). In general, they need to complete their dissertations (dissertation defense).

Faculty career path. A faculty career path is a traditional career path for doctoral degree holders in the United States (Enders 2004; Gemme & Gingras, 2012). It is often referred to a tenure-track professor position in a research-oriented university, teaching-oriented university, or community college. More recently, full-time non-tenure faculty positions (e.g., teaching faculty, research faculty, lectures, instructors) have been growing in prominence on higher education campuses (Kezar & Gehrke, 2014), broadening the variety of faculty roles.

Non-faculty career path. A non-faculty career path is an occupational option available for doctoral degree holders other than the faculty career path. This path is often categorized into 1) academic professional sector (e.g., administrator in academia), 2) governmental sector, 3) industry sector, and 4) non-profit sector.

Self-efficacy. Bandura's (1986) definition of self-efficacy referring to "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 391) is adopted in this study. Simply put, self-efficacy relates to personal capabilities to successfully perform particular behaviors (Can I do this?, Lent et al., 2002). More detail regarding self-efficacy is available in Chapter 2.

Outcome expectations. This study adopted outcome expectations grounded in SCCT. Outcome expectations are defined as personal beliefs about "the consequences or the outcomes of performing particular behaviors" (Lent & Brown, 1996, p. 312). Outcome expectations are concerned with the possible consequences of performing certain behaviors (e.g., If I do this, what will happen?, Lent et al., 2002). More detail regarding self-efficacy is available in Chapter 2.

Contextual/environmental influences on the career decision-making process. This study employed SCCT's categorization of contextual influences on an individual's career decision. Contextual influences are categorized into distal and proximal contextual influences. These influences interact with individual's cognitive variables (e.g., self-efficacy) in the course of individuals' career behaviors to make a career decision. They provide positive, negative, or neutral impacts on people's career decision-making process (Lent, Brown, & Hackett, 2000). The specific definitions of two contextual influences are provided as below (More detail regarding self-efficacy is available in Chapter 2).

- ***Distal, background contextual influences*** are factors that affect types of learning opportunities and experiences to which individuals has been exposed over time, which in turn influences individual self-efficacy and outcome expectations. Examples include person inputs such as gender and race-ethnic differences and cultural role socialization, disability status (Lent et al., 1994).

- ***Proximal contextual influences*** are factors are particularly conceptualized either career barriers (obstacles) or environmental supports (facilitative effects) and particularly critical during active stage of academic or career decision-making (Lent et al., 2000; Lent & Brown, 2006). Examples of proximal influences include financial and emotional supports from peer or academic advisor.

CASVE Cycle. The CASVE Cycle is a core construct of the Cognitive Information Processing theory proposed by Sampson et al. (2004). It consists of the five sequential phases of Communication (C), Analysis (A), Synthesis (S), Valuing (V), and Execution (E) that

individuals go through by gathering, transforming, and applying information to make a career decision (Sampson et al., 2004). More detail of the CASVE cycle is available in Chapter 2.

Limitations of the Study

For the data collection of this research, this study selected a large, public, and research-oriented U.S. Midwestern university (USMU) that was a predominantly white institution. Participants were purposefully selected based on their current status in a particular program (doctoral candidate who passed the preliminary examination). Since the data were collected from a particular population of students at a selected single university, the participants of the study were not able to represent the diversity of students enrolling in U.S. higher education institutions. Thus, caution is encouraged when considering an application of the findings to other populations or other institutions, or for making generalizations based on the findings of this study.

Although most of the ABD doctoral students at USMU were invited to participate in the surveys through email initiations from USMU's campus system, their participations in this study were completely voluntary. This led to questions regarding students' self-selection for study participation because they might contain a positive attitude toward the study and provide positive aspects when answering survey or interview questions. Further, the study's research design limited data collection to fully examining doctoral students' experiences as this study primarily focused on self-reported interviews and self-reported survey measurements. Other data sources, such as university records, were not collected as resources to support or verify the findings of the study. Therefore, this study could not avoid the possibility that responses to this study were influenced by participants' tendency to be viewed as socially desirable. Despite this limitation, self-reported data collection was more appropriate for the purpose of the study as it explored

doctoral students' internal processes of career decision-making and their perceived effects of contextual influences on pursuing their sought post-graduate career paths.

This study examined perceptions of process-specific self-efficacy, process-specific outcome expectation, career barriers, and environmental supports as guided by SCCT. This approach helped in understanding how doctoral students perceive their environment to pursue their own career choice, which, in turn, helped to better understand environmental influences to balance the internal processing focus of the CASVE cycle. However, this study did not examine an entire structure of SCCT, which might fail to fully notice other important effects yielded by other SCCT variables, such as interest, goal/intentions, and performance on doctoral students' career choices.

Additionally, the interviews were conducted based on the self-developed interview questions. Although these interview questions were guided by a well-established theory, the CIP theory, and developed based on thorough reviews by doctoral-level experts in qualitative research and the CIP theory, interview data yielded in this study could not avoid the possibility of failing to fully account for the career decision-making process proposed by the CASVE cycle. Thus, caution is also recommended in interpreting findings of the study.

Chapter 2

Literature Review

Before presenting the methods and results of this study, an examination of theoretical modes of analysis and previous research is necessary to better understand the underlying mechanisms of career decision-making processes. This literature review includes empirical studies relevant to examining career decision-making process that are grounded in the theoretical frameworks of CIP theory and SCCT. This is followed by existing studies on doctoral students' career-related experiences to identify current understandings of this issue.

This chapter explores four themes related to the purpose of this study. The section begins with a discussion of doctoral students' career development as a part of today's workforce and economic development strategies. From the perspective of workforce development, the review motivates why this particular population is important. In the subsequent section, a theoretical understanding of the career decision-making process is reviewed from the perspectives of CIP theory and SCCT. Within the context of SCCT, environmental influences, such as supports and barriers, are explored as they relate to the career choice process. The following section examines theory integration and the relationship between CIP theory and SCCT.

The next section reviews and critiques empirical studies grounded in both CIP theory and SCCT. Due to the lack of literature, focusing on doctoral students' experiences related to the career decision-making process, the review of empirical studies grounded in CIP theory and SCCT mainly focuses on general student populations in higher education, such as undergraduate students. This review provides a basic understanding of what has been studied and the limitations of current research in relation to the career decision-making process. Then, the current research gaps existing in literature on doctoral students' career choices are separately presented after

reviewing what is known about doctoral students' career-related experiences. Finally, the chapter concludes by summarizing the highlights and limitations of current studies, discussing areas where further research is necessary, and identifying how this study will partially fill these needs.

Relevant scholarly publications were identified through the University of Illinois' online library system, which provides access to major journals. In particular, *ProQuest* was selected to locate literature for review in this study because it simultaneously searches 80 electronic journals or databases (meta-search), including ABI/INFORM, ProQuest Dissertations & Theses Full Text, PsycARTICLES, PsycINFO, Sociological Abstracts, and ERIC. The literature review first identified key search words for accessing relevant research. Based on the topic of study, major keywords used in this study included the following: *career decision-making process, career choice, career decision, social cognitive career theory, cognitive information processing, environmental influences, career supports, career barriers, advisor relationship, advisee relationship, doctoral advisors, doctoral students, highly educated workers, knowledge workers,* and *knowledge workforce*. These selected keywords were combined to search resources for this review via the title and article abstracts.

The criteria for selecting literature were limited to scholarly works in peer-reviewed scholarly publications. Using the keywords indicated above led to the identification of 1,052 articles. After removing duplicates and non-scholarly publications, such as opinions, editorials, and book reviews, a total of 421 unique sources were reviewed based on their titles. After the review of titles, a total of 199 articles remained for the abstract review. As a result of the abstract review on the selected literature, a total of 127 articles were selected for the full paper review. In addition to this process of literature selection, related articles were added by reviewing references of the identified publications, such as frequently referenced articles (e.g., Hackett,

Lent, & Greenhause, 1991; Hackett & Betz, 1981; Lent & Brown, 1996; Lent et al., 1994, 2002; Sampson et al., 2004).

From the selected literature, various populations, including battered women, minority populations, such as Latinos, African Americans, undergraduate students, first-generation college students, individuals with disabilities, high school students, and adolescents of lower socioeconomic status, were examined by applying these theories to understand how career choices were made. In order to focus on doctoral students' career experiences in this study, publications were chosen that addressed topics related to the career decision-making process.

This search effort produced a collection of theory-building literature and empirical research based on theory, primarily derived from research-oriented, peer-reviewed journals. This study was not restricted to a specific period of time or fields of publication.

Doctoral Students Development: Developing the Next Generation of Knowledge Workforce

Today, knowledge workers increasingly influence economic growth as knowledge becomes the mainstay of all sectors (Ehin, 2008). A *knowledge worker* is defined as an internally sourced individual who creates value and new ideas by applying and transforming knowledge (Carleton, 2011; Drucker, 1994; Nickols, 2000). Such individuals "require formal education and the ability to acquire and apply theoretical and analytical knowledge [as well as] a habit of continuous learning" (Drucker, 1994, p. 62). Specifically, organizations express a strong need for advanced knowledge workers with a doctoral level education background equivalent (Lee & Boud, 2008; Meyer, 2013; Nerad, 2010; Paré et al., 2011). This particular workforce serves as a key driver of sustainable growth in a knowledge-based economy by creating knowledge through specialized research and effectively transforming knowledge (Meyer, 2013; Ruth & Tan, 2011; Yigitcanlar et al., 2007).

Despite an urgent need for this workforce, organizations continuously experience a shortage of knowledge workforce (Lehmann, 2009; Pobst, 2014; West, Bogumil, & Walter, 2000). This disparity prompts scholars and practitioners' attention to the field of workforce development, such as HRD, in order to develop strategies to attract, retain, and develop talent (Carleton, 2011; Lehmann, 2009). In the past decade, scholarly and practical attention in HRD has been dedicated to understanding how to attract or retain knowledge workers within an organization (e.g., Aiman-Smith, Bergey, Cantwell, & Doran, 2006; Carleton, 2011; Doh et al., 2011; Ehin, 2008; Tampoe, 1993; Yigitcanlar et al., 2007). However, significantly less research in HRD aims to understand how to best train and develop the future knowledge workforce to satisfy the current shortage of knowledge workers. Such knowledge workforce scarcity at the organizational level may be partially addressed by educating doctoral students who are recognized as important for future generations of the advanced knowledge workforce (Lee & Boud, 2008; Meyer, 2013; Most, 2008; Nerad, 2010; Paré et al., 2011).

Recently, this workforce development perspective became more critical for both higher education and HRD due to workforce misalignment in a traditional academic labor market (Carlucci, 2013; Fuhrmann et al., 2011; Rudd & Nerad, 2015). There are too few tenure-track jobs for doctoral holders who are qualified to compete for them (Teitelbaum, 2008; Thune, 2009). Ultimately, this fundamental misalignment in job markets shifts career placement patterns of doctorates graduates (Rudd & Nerad, 2015; Wendler et al., 2012).

It is no longer the case that doctoral students may assume with any certainty that they will enter traditional career paths, such as faculty positions (Enders 2004; Gemme & Gingras, 2012; Nerad 2009). Rather, they need to prepare for a variety of careers, not just to become a tenure track faculty but also to teach and conduct research in government, industry, and non-profit

organizations (Nerad, 2010, 2011). This new workforce reality requires more diverse skills and abilities that were not traditionally emphasized in doctoral education, such as teamwork, communication, self-promotion, managing people, and budgeting finances (Lee et al., 2010; Nerad, 2010; Nerad et al., 2007; Rudd, Nerad, Morrison, & Picciano, 2008).

To prepare this knowledge workforce to obtain careers where they can utilize their talents as well as address challenges due to the scarcity of knowledge workers in government sectors and organizations (Banejee & Morley, 2013; Nerad, 2010), it is a critical moment for HRD to identify the needs of doctoral students for career guidance during a doctoral program based on an understanding of how career choices are made. Such research will investigate how to create opportunities to encourage doctoral students to make more informed career decisions based on their career interests so that they might engage in relevant learning opportunities and career interventions to prepare a successful transition from student role to professional role. Eventually, such research and practices enable doctoral graduates to maximize their abilities as advanced knowledge workers both inside and outside academia while meeting an evident need for knowledge workers for organizational and economic development (Nerad, 2010).

Theoretical Understanding of Career Decision-Making Process Grounded on CIP theory and SCCT

This section is designed to provide a theoretical foundation for this study by examining historical developments of theory and research with respect to how a career choice is made. Theoretical foundations of the CIP theory and SCCT are individually discussed. This discussion is followed by an exploration of potential interrelations between CIP theory and SCCT in terms of understanding the underlying processes through which individuals make career choices.

Cognitive Information Processing (CIP) theory. In order to strengthen the connection between practice and theory in the field of career development, the cognitive information processing (CIP) theory is developed and applied to career development and services (Peterson et al., 1991; Sampson, Lenz, Reardon, & Peterson, 1999; Sampson et al., 2000, Sampson et al., 2004). The aims of the CIP theory are to help individuals to make an appropriate career choice for the present while also helping them to learn skills related to career problem-solving and decision-making so that they can apply them to solve other career problems faced during their lifetime (Sampson et al., 1999; Sampson et al., 2004). In particular, this theory integrates career problem-solving and decision-making processes to guide individuals through the career choice process.

The CIP theory is grounded on the following assumptions (Peterson, Sampson, Lentz, & Reardon, 2002; Sampson et al., 1999; Sampson et al., 2004): (1) a career choice involves an active interaction between thoughts and emotions; (2) career decision making is based on both career problem-solving and decision-making processes; (3) effective career decision-making requires individual's knowledge and a cognition process of the knowledge; (4) career problem solving and decision-making are skills that can be improved through practice.

First, both thoughts (cognition) and emotion (affect) influence individuals' career decision-making processes. When an individual makes a career choice, his or her emotions can hinder or motivate a certain choice. Thus, cognition and affect are inseparably linked in the making of a career choice. Another foundational assumption of CIP theory is that career problem solving and decision-making processes are necessary to making an effective, appropriate career decision. In CIP theory, a *career problem* is the career *gap* as a result of recognizing difference between where an individual is and where she or he wants to be (Sampson et al., 2004). Through

problem solving, individuals obtain information and apply it to cognitive strategies to make a career choice that can narrow their perceived career gap (Sampson et al., 2004). *Decision making* involves cognitive and affective processes to develop a plan specific action steps. Outcomes of decision-making are personal behaviors necessary for solving a career problem and accomplishing a career choice (Sampson et al., 1999).

Moreover, effective career decision making is built on the individual's knowledge and a thinking process by applying the knowledge. According to CIP theory, *knowledge* is considered as "the content of career choice (what we know)," and *thinking* is described as "the process we use (what we need to do) to make choices" (Sampson et al., 2004, p.3). Lastly, CIP theory considers that career decision-making skills are something that people can develop and improve by practicing information-processing skills (Sampson et al., 2004).

Two core constructs of the CIP theory-based approach are as follows: (1) Pyramid of Information Processing, and (2) the Communication, Analysis, Synthesis, Valuing, and Execution (CASVE) cycle (Sampson et al., 1999; Sampson, Peterson, Lenz, & Reardon, 1992). The Pyramid of Information Processing describes the *content* of the career problem solving and decision making, including self-knowledge, occupational knowledge, decision-making skills, and meta-cognitions. The CASVE cycle illuminates the *process* of the career problem solving and decision making including the phases of communication, analysis, synthesis, valuing, and execution. By providing both the content (knowing) and process (doing) of career decision making, the CIP theory-based approach helps individuals to acquire clear criteria for monitoring their progress while making an appropriate career choice. Both constructs can be used alone to guide career decision making, or they can be integrated with other career theories, such as

Holland's theory (e.g., Thrift, Ulloa-Heath, Reardon, & Peterson, 2012) and SCCT (e.g., Bullock-Yowell et al., 2012) to obtain greater understanding of career choice process.

Content of career decision making: The Pyramid of Information Processing. The pyramid of information processing domains, regarding career decision making, is composed of three domains as presented in Figure 2.1 (Peterson et al., 1991; Sampson et al., 1999). The pyramid indicates key elements involved in making a career choice and what information is necessary for individuals to know when making a career decision (Sampson et al., 2004). The three domains include the knowledge domain, the decision-making skills domain, and the executive processing domain.

The base of the pyramid is referred to as *knowledge domains*, including what individuals understand about themselves and their current career options. Above the knowledge domains, the midlevel of the pyramid is related to the *decision-making skills* that individuals generally use to solve career problems and to make a career decision. Lastly, the *executive processing* domain is at the top of the pyramid. It involves metacognitions, such as how individuals' cognitive factors influence the way they make a career choice. These thoughts can be negative and positive and ultimately, they play a critical role in how individuals respond to career decision-making process (Sampson et al., 1999; Sampson et al., 2004).

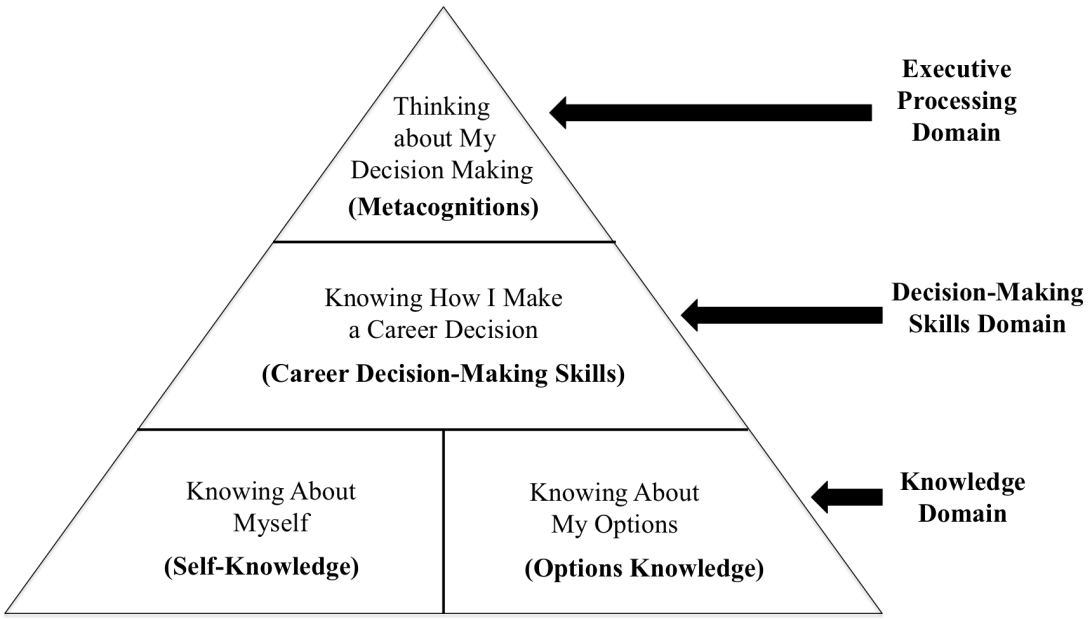

Figure 2.1. Pyramid of information processing (adjusted from Sampson, Peterson, Lenz, & Reardon, 1992)

Knowledge domains: Knowing myself and my options. Knowledge domains include self-knowledge and occupational knowledge. These are foundations for the domains above it because individuals need to collect and reflect on information prior to making a career choice (Sampson et al., 2004). The key elements of self-knowledge (knowing myself) include individual's values, interests, skills, employment preferences, and family situations (Peterson et al., 1991; Sampson et al., 2004). *Values*, according to the CIP theory, are referred to as something important for an individual to pursue a certain career or work path. *Interests* indicate individual's preferences toward particular objects or activities. *Skills* are defined as particular behaviors that individuals perform well. Certain criteria that an individual desires to obtain (e.g., a particular location) or to avoid (e.g., working the night shift) are defined as *employment preferences*. Lastly, *family situations* can influence career choices and form part of employment preference (e.g., the desire to find career options where an individual can reside close to a significant other).

Individuals' characteristics and past experiences typically form their perceptions on values, interests, abilities, and preferences. Individuals obtain more self-knowledge as they become mature and gain more life experiences. Their self-knowledge becomes clear by reflecting on what they have done previously and have learned about themselves (Sampson et al., 1999; Sampson et al., 2004). Moreover, self-knowledge is kept in episodic memory (Tulving, 1984), which is composed of individual perceptions, rather than testable facts, and constructed as a set of episodes over time. Thus, the information stored in episodic memory is affected by how an individual interprets his or her past experiences (Sampson et al., 2004). For example, an individual is more likely to recall only the negative aspects of a certain skill if she or he experienced a humiliating failure in performing the activity required that skill. A person's present emotions also impact episodic memory (Sampson et al., 2004). For instance, an individual who is currently depressed is more likely to remember negative experiences and generalize their current interests and skills in a limited manner.

Options knowledge (knowing my options) includes not just knowledge related to occupations but also knowledge of education and employment trends (Sampson et al., 1994; Sampson et al., 2004). Individuals accumulate occupational knowledge through their hands-on experiences and vicarious experiences. Although an individual obtains more knowledge of career options over time that is similar to nature of the self-knowledge, options knowledge is saved in semantic memory (Sampson et al., 2004) that is composed of testable facts, rather than individual perceptions. Thus, options knowledge is "not overly" (p.23) influenced by people's perceptions of current emotional status (Sampson et al., 2004).

CASVE cycle: Knowing how I make a career decision. The decision-making skills domain is located at the middle of the pyramid. Decision-making skills involve applying

information collected from knowledge domains to solve career problems and make a career decision (Sampson et al., 1999). This includes the following aspects: a gap among one's current and desired position (communication), assessing one's self and options (analysis), creating alternatives (synthesis), making a primary decision by prioritizing alternatives (valuing), and taking action to close the gap (execution). Detailed descriptions of each aspect of the cycle will be provided in the following section.

Executive processing domain: Thinking of my decision-making. The executive processing domain is at the top of the pyramid. It includes metacognitions that influence how individuals think and make career decisions (Sampson et al., 1999). Metacognitions include self-talk, self-awareness, monitoring, and control (Sampson et al., 1999; Sampson et al., 2004). *Self-talk* is defined as the silent discussion that individuals have with themselves regarding their previous, current, and future capabilities to perform a certain task (Sampson et al., 1999). Self-talk can be either positive or negative. Positive self-talk encourages individuals to: 1) stay motivated when unexpected events happen during the career decision-making process, 2) keep away from distractions while remaining focused on making a good career choice, and 3) implement what they planned after a career choice is made. For example, an individual who is not sure how to get information necessary to make a career choice would think "I can make a good career decision because I know I can find career options right for me as soon as I get information" if his or her self-talk is positive. In contrast, negative self-talk typically makes the career decision-making process more difficult (Sampson et al., 2004). An example of an individual with negative self-talk would be "I cannot make a career choice right for me because I am always not good at making decisions alone." Thus, it is critical for individuals to become aware of their negative

thinking to avoid the potentially harmful consequences (Sampson et al., 1999), which is related to another component of the executive processing domain: *self-awareness*.

Self-awareness refers to "the extent to which people are aware of themselves as they progress through the decision-making process" (Sampson et al., 2004, p. 24). This involves being aware of their thinking, emotions, and behaviors as well as the consequence of the interactions among them (e.g., how their self-talk might impact their career choice, Sampson et al., 1999). *Monitoring* refers to a person's ability to follow her or his progress through the career decision-making process. *Control* indicates a person's ability to be actively involved in the next proper career decision-making task. For example, people with effective monitoring and control abilities know when their tasks in a certain phase have been completed successfully so that they continue with next phase in the decision-making process (*monitoring*) while controlling negative thoughts that may cause difficulties completing tasks (control). People with effective monitoring and control abilities can distinguish between the "knowing" and "doing" aspects during the career decision-making process and keep track of them (Sampson et al., 1999; Sampson et al., 2004). In other words, they clearly understand "what they know and what they need to know, as well as what they need to do" (Sampson et al., 2004, p. 49) during the sequences of process associated with their career choices.

Interrelations among three domains. All three domains of the pyramid are strongly related to one another from the top-down direction. The executive processing domain performs a key role in the function and content of all other domains (Sampson et al., 2004). For instance, an individual involved in negative self-talk might produce thoughts, such as, "I cannot decide what to do with my career because I am not good at making a decision, so I have to wait until my advisor tells me what career I have to choose." In this case, she or he is more likely to avoid

responsibility for making a career choice, and this attitude prevents her or him from engaging in career decision-making strategies due to a self-imposed negative perception on her or his ability to make a decision. In fact, this state of indecision causes anxiety and concern.

Process of career decision making: CASVE cycle. As briefly discussed in the earlier section, the CASVE cycle presented in Figure 2.2 is another core construct of the CIP theory. It conceptually describes the process involved with decision-making skills and indicates the sequence of key steps regarding what an individual needs to do in order to make a career decision (Peterson et al., 1991; Sampson et al., 1999; Sampson et al., 1992). The CASVE Cycle consists of the five sequential phases of Communication (C), Analysis (A), Synthesis (S), Valuing (V), and Execution (E) that individuals move through by gathering, transforming, and applying information to make a career decision (Bullock-Yowell et al., 2012; Sampson et al., 2004). Thus, the cycle can be used as a guide to help individuals with decision making (Sampson et al., 1992).

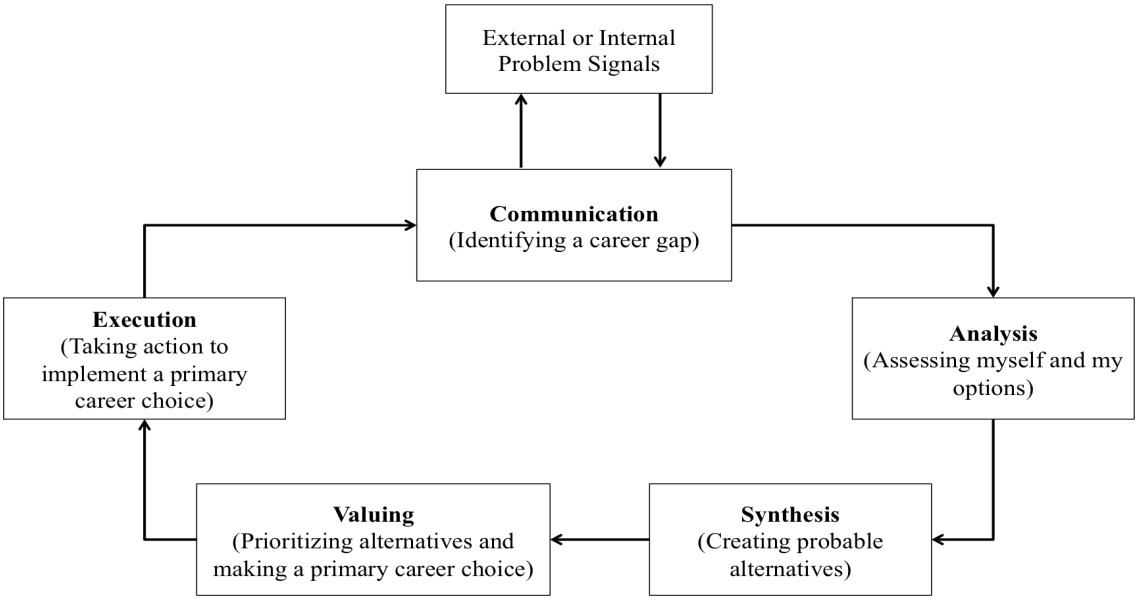

Figure 2.2. The CASVE cycle (adjusted from Sampson, Peterson, Lenz, & Reardon, 1992)

Communication phase: Identifying a career gap. During this phase, individuals recognize that there is a gap that exists between "where they are and where they want to be" (Sampson et al., 2004, p. 26) in terms of their career. They become aware that they need to make a career choice to narrow the perceived gap and to reach their desired situation. This awareness is a result of negative or positive internal (e.g., negative emotions such as anxiety) or external (e.g., conversations regarding career plans with significant others) cues that they obtain through interactions with themselves and their environment (Bullock-Yowell et al., 2012; Peterson et al., 1999; Sampson et al., 1999). People are typically motivated to engage in career-related activities (e.g., seek career assistance from career professionals) when the level of felt discomfort becomes higher than their perceived fear of change (Sampson et al., 2004).

Analysis phase: Assessing myself and my options. In the analysis phase, individuals attempt to better understand their identified career-related gap. Individuals in this phase clarify the causes and nature of the career problem. They establish a mental model of the career problem by recognizing their career options as well as key factors affecting both themselves and their options. This clarification assists them to build an understanding of the relationships among these factors (Sampson et al., 2004).

During this process, individuals clarify their self-knowledge regarding their values, interest, skills, and employment preferences, and seek to enhance their knowledge of career options. They can identify the factors influencing the self and one's career options (Bullock-Yowell et al., 2012; Sampson et al., 2000; Sampson et al., 2004). For instance, a person in this process may identify that she or he holds a stereotype that affects her or his current status in an undecided situation (Sampson et al., 2004). This stereotype can cause negative self-talk, resulting in excluding particular career options.

The analysis phase can be considered as an ongoing process. Individuals become involved in a repeated process of clarifying and reflecting on their existing knowledge. They integrate what they have newly learned, resulting in expanding their knowledge about themselves and their career options (Sampson et al., 2004).

Synthesis: Creating probable alternatives. The purpose of the third phase of the CASVE cycle, synthesis, is to determine the probable alternatives to narrow or remove the gap while preventing feelings of being overwhelmed by all other options (Sampson et al., 2004). Individuals engage in two stages: elaboration and crystallization. In the stage of elaboration, individuals become involved in *divergent thinking* (Sampson et al., 2004, p. 28) that expands the mind to generate a list of possible options to address a career problem (Sampson et al., 1999). This list is developed based on the results of the analysis phase. The person's previous relevant experiences also influence the list's creation in the elaboration stage.

Once individuals recognize the possible options, they move to the crystallization stage. Through "convergent thinking" (p. 28), they narrow the list by removing options that are not congruent with the individuals' values, interest, skills, and career preferences (Sampson et al., 2004). As a result of the crystallization process, individuals obtain a manageable number of feasible career options (Bullock-Yowell et al., 2012; Sampson et al., 1999). Similar to the elaboration stage, individuals can apply what they learned in the phase of analysis.

Valuing: Prioritizing alternatives and making a primary career choice. Throughout the valuing phase, individuals prioritize their remaining career alternatives based on considerations of their beliefs and career preferences, as well as possible influences of their environment, such as significant others, community, and society at large (Sampson et al., 1999; Sampson et al., 2004). After the evaluation, they arrive at a tentative, primary career choice that makes the most

effective use of costs and benefits, while career needs are met (Sampson et al., 2004). Deciding on a primary career choice involves either identifying the targeted career areas or specifying a particular position for which they want to apply (Sampson et al., 1999). Sometimes individuals need to return to the phases of communication or analysis if they cannot make a decision among the existing career options (Sampson et al., 1999).

Execution phase: Taking action to implement a primary career choice. Individuals eventually put their decision into action in the phase of execution. In order to implement their first career choice, they develop and execute a plan. Specifically, this phase is divided into three stages: (1) planning, (2) trying out, and (3) applying (Reardon, Lenz, Sampson, & Peterson, 2000). The planning stage involves developing a plan to obtain a career goal. Trying out involves initiating part of the plan in order to gain more information and experience regarding the implementation of the plan. Finally, individuals in the stage of applying fully engage in executing the entire planned course of action (Reardon et al., 2000). The plan established in this phase typically contains identifying and selecting workshops or programs that can help prepare for achieving one's chosen career option, reality-testing by obtaining hands-on experience, and carrying out the steps required to search, select, apply for, and obtain a desired job (Sampson et al., 2004).

Communication phase: Determining whether or not the original gap was resolved. Once the phase of the execution is complete, individuals then return to the communication phase to check whether or not their original career gap was successfully resolved. If an individual perceives that the gap is resolved, the career decision-making process ends until a new career problem becomes evident. However, the process proceeds through the CASVE cycle again if the internal or external signals signify that the gap still exists (Sampson et al., 1999).

An individual making a career decision is faced with a complex and overwhelming number of aspects to consider and perform. CIP theory provides "a set of easy-to-understand concepts" (Sampson et al., 2004, p. 18) that individuals can use to guide them through career decision-making. The CIP theory-based approach presents a sequential structure of how individuals collect, convert, and apply information to make a career choice (Bullock-Yowell et al. 2012). Moreover, the CIP theory offers a comprehensive framework for understanding decision-making processes, integrating cognitive, affective, and behavioral aspects.

As discussed earlier, the CIP theory helps scholars to understand how people solve career problems and make career decisions, by offering a specific, concrete internal information processing structure (e.g., CASVE cycle, Bullock-Yowell, et al., 2012; Sampson et al., 2004). However, CIP theory does not frame explicitly external factors in its theoretical framework; although, it considers their impacts on individuals' cognitions and emotions during the decision-making process, such as the effects of significant others on employment preferences in the knowledge domain. Those external factors are rather implicit in its framework. Thus, SCCT is incorporated with the CIP theory as a theoretical framework of this study in order to better capture how external factors, such as environmental factors (e.g., career barriers), influence people's career choices. The detailed information of SCCT is provided in the following section.

Social Cognitive Career Theory. SCCT remained to be considered as a well-established, comprehensive theoretical framework used to understand the dynamic mechanisms through which individuals interact with the cognitive and contextual factors that shape career-related interest, influence academic or career choices, and implement career choices (Lent & Brown, 2006; Lent et al., 2000; Raque-Bogdan, Klingaman, Martin, & Lucas, 2013; Swanson et al., 1996). Lent et al. (1994) initially proposed SCCT as a part of a series of theory-building efforts,

aiming to establish more comprehensive career models by integrating theoretically-related constructs. In this framework, individual cognitive and learning processes are emphasized to complement other existing career theories or constructs.

Prior to a close examination of the theoretical structures of SCCT, this section begins with a brief overview of the distinctive mechanisms of Social Cognitive Theory that are theoretically fundamental to SCCT. Lent et al. (1994) conceptualized SCCT as two theoretical levels that affect career interest and behaviors: cognitive-person variables and contextual-person variables. The first level presents cognitive-person variables, including self-efficacy, outcome expectations, interests, goals, choices, actions, and the self-appraisal of the outcomes from implemented actions that help individuals to obtain a sense of personal agency and exercise it (Lent et al., 2000). The second level explains the ways in which other important contextual (e.g., social, cultural, and economic) and personal (e.g., gender and race-ethnicity) variables interrelate with individual's cognitive variables in the course of career development. These external influences are considered as environmental supports and career barriers that provide positive, negative, or neutral impacts on how an individual makes a career or academic choice (Lent et al., 2000).

SCCT is grounded in Social Cognitive Theory. SCCT is founded in Bandrua's (1986) Social Cognitive Theory that highlights a dynamic and triadic reciprocated interaction of individual attributes, such as internal cognitive and physical attributes, overt behaviors, and the environment in which the individual performs behaviors (Lent & Brown, 1996; Lent et al., 1994). Within this triadic model, Social Cognitive Theory emphasizes the role of self-referential thought in guiding individual motivation and behaviors (Bandura, 1986; 1989; Lent et al., 1994; 2002). According to Social Cognitive Theory, individuals become "products and producers of

their environment" (p.362) through the interacting, bidirectional influences among individuals, behaviors, and external environments (Wood & Bandura, 1989).

In order to conceptualize personal career development mechanisms within this triadic causal model, Lent et al. (1994) incorporated three of the following core constructs from Banruda's (1986) Social Cognitive Theory: 1) self-efficacy, 2) outcome expectations, and 3) goals. These three constructs are considered to be fundamental determinants that enable individuals to exercise personal agency during career development processes (Lent et al., 1994; 2002). In particular, a strong emphasis has been placed on self-efficacy among the three variables (Hackett & Lent, 1992; Lent et al., 1994; 2002; Lent & Brown, 2006).

According to Bandura (1986), self-efficacy is defined as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 391). It has been considered as the most central and pervasive mechanism of personal agency (Bandura, 1989). Since Hackett and Betz (1981) introduced self-efficacy into the career literature, self-efficacy has been found to predict academic and career-related choices and linked to performance outcomes (Lent et al., 1994; Lent & Brown, 2006). Self-efficacy influences one's decisions of activities and environments, how much effort an individual will invest in her or his endeavor, how long she or he will persist when confronting barriers and aversive experiences (Bandura, 1977, 1986, 1989). This set is contextualized to particular behavioral tasks and settings (Bandura, 2006; Lent et al., 1994, 2002).

According to Bandura (1986, 1997), there are four crucial sources of information to develop and modify self-efficacy over time: (1) performance accomplishments, (2) vicarious experience, (3) verbal persuasion, and (4) physiological and affective states. *Performance accomplishments* are considered the most influential source, among the others, and refer to

personal experiences with performing a task or behavior in question. An individual's prior hands-on experience of repeated successes can make self-efficacy stronger, while prior failure experiences can weaken self-efficacy. Besides authentic personal experience, self-efficacy is also acquired from *vicarious experience*. Observing others successfully complete a task or behavior can enhance observers' expectations that they too will succeed if they continue to expend their efforts. *Verbal persuasion* is one of the widely used interventions to influence people's beliefs that they have the abilities to accomplish what they pursue, due to its easiness and availability. For example, people tend to believe that they can overcome activities in questions through suggestions or encouragement by others. However, verbal persuasion is likely to be less effective than one's own accomplishment because it does not offer a direct, genuine experiential foundation for people. Lastly, *physiological and affective states* partially influence how an individual judges his or her personal capabilities in a certain situation. In particular, emotional arousal is often elicited when people confront stressful and challenging situations.

Individual's beliefs about probable outcomes, as a result of performing a certain behavior, are defined as *outcome expectations*, which is another critical construct in Social Cognitive Theory (Lent et al., 1994, 2002; Bandura, 1977, 1997). Like the sources impacting self-efficacy, outcome expectations are also influenced by individual's past learning experiences (Lent et al., 1994), but they are distinguished from self-efficacy (Bandura, 1977; Lent et al., 2002). While outcome expectations are concerned with the possible consequences of performing certain behaviors (e.g., *If I do this, what will happen*?), self-efficacy is regarded as personal capabilities to successfully perform particular behaviors (e.g., *Can I do this*?) (Lent et al., 2002).

The last core construct, derived from Social Cognitive Theory, is *goals,* which is a widely-used concept that is often referred to in career literature variously, as follows: career

aspiration, career plan, expressed career choice, and career decision (Lent et al., 1994). In Social Cognitive Theory, goals play a vital role in regulating individual motivations and behaviors (Bandura, 1999; Lent et al., 2002). Goals are considered one of the critical foundations for prompting individuals to be involved in specific activities or to influence certain future outcomes (Bandura, 1986). Although individuals' motivation and actions are influenced by environmental and historical factors, people can organize, control, and sustain their own behaviors by establishing goals, even in the absence of external supports or reinforcement (Lent et al., 1994, 2002).

In Social Cognitive Theory, the abovementioned three core constructs – self-efficacy, outcome expectations, and goals –continuously interact with one another bi-directionally to guide and regulate people's motivation and actions (Bandura, 1986, 1999; Lent et al., 2002). For example, self-efficacy and outcome expectations influence the goals that individuals set and how much effort they spend in such pursuits. The determined goals, in turn, have an impact on acquiring or developing perceptions of individual's self-efficacy and outcome expectations (e.g., success in attaining a goal improves self-efficacy and outcome expectations).

Based on Bandura's Social Cognitive Theory, two major branches of social cognitive inquiry were evolved in the field of career development: (1) Krumblotz, Mitchell, and Jones's (1976) social learning theory of career decision making, and (2) Hackett and Betz's (1981) application of self-efficacy to women's career development (Lent et al., 1994, 2002). Particularly, through scholarly efforts to translate self-efficacy to career development processes, Hackett and Betz (1981) helped other researchers to orient the practical and theoretical probable linkage between self-efficacy and career domains (Lent & Brown, 2006).

SCCT is more tied to the perspective of Hackett and Betz (1981), although Krumboltz et al.'s (1976) theory partially influenced SCCT development. For example, SCCT agrees with Krumboltz et al.'s emphasis placed on people's direct and vicarious learning experiences that help to develop career interest, values, and choices. Also, both acknowledge the impact of environmental factors on people's career-related behaviors or choices. However, these theories are distinctly different in terms of their theoretical roots and their core constructs to explain career development processes. Theoretically, Krumblotz et al.'s (1976) theory is mainly derived from social learning theory (Bandura's earlier position). SCCT is directly developed from Social Cognitive Theory. Although both theories agree on the critical role that learning experiences play in behaviors as reinforcement, SCCT is more focused on the particular cognitive mediator, such as self-efficacy, through which past learning experiences shape career behaviors (Lent et al., 1994, 2002). It also emphasizes the ways in which personal agency is exercised by individuals for their career development. Table 2.1 presents a brief overview of the major roots of SCCT.

In an effort to build an integrative framework to bridge and complement existing theories and research in the field of career development (Lent & Brown, 1996; Osipow, 1990), Lent et al. (1994) built SCCT. It is primarily based on Bandura's (1986) Social Cognitive Theory and Hackett and Betz's (1981) application of self-efficacy to career development, as well as partially derived from Krumblotz, et al.'s (1976) theory. SCCT (Lent et al., 1994, 2002) helps to create more organized and comprehensive understandings of how a career choice is made, and it also provides a sufficient research and practical base for developing and providing career interventions.

Table 2.1

Brief Summary of Major Roots of SCCT Developed based on Lent et al. (1994)

Theorist	Theoretical Aspects that Influence SCCT
Bandura (1986)	Social Cognitive Theory's (Bandrua, 1986) triadic reciprocal interactions among individual attributes, behaviors, and environments, especially several core individual mechanisms (self-efficacy, outcome expectations, and goals) that help guide individual's career development processes
Hackett and Betz (1981)	An initial study to conceptualize a theoretical linkage between self-efficacy and career domain by applying self-efficacy to facilitate women's career development
Krumblotz et al. (1976)	Emphasis on individual learning experiences that help develop career interest, values, and choices and the acknowledgement of the importance of environmental forces on individual's career-related behaviors

SCCT is comprised of "two complementary levels of theoretical analysis" (Lent et al., 2000, p. 36). The first layer indicates cognitive-person variables, including self-efficacy, outcome expectations, and goals. Cognitive-person variables enable an individual to exercise agency, such as personal control, over his or her own career path (Lent et al., 1994, 2000). While the first level of analysis in SCCT mainly focuses on people's internal career-related decision-making processes, the second level conceptualizes environmental influences relative to individual career behaviors. The second level presents personal (e.g. gender) and contextual inputs (e.g. career barriers, supports), influencing career-related interests and behavior choices (Lent et al., 2000; Smith, 2001). The following sections discuss two theoretical analysis levels in detail.

SCCT's internal process through cognitive-person variables. SCCT's cognitive-person variables highlight socio-cognitive mechanisms that influence people's academic and career development. As illustrated in Figure 2.3 it is composed of seven variables. Within the SCCT's internal process (Lent et al., 1994, 2002), and through repeated performance achievements, individuals shape a sense of their self-efficacy beliefs in particular behaviors or tasks, as well as obtain certain expectations about the probable outcomes of their behaviors (path *a* and path *k*). The formation of career interests is directly influenced by these perceptions of self-efficacy beliefs and outcome expectations (path *b* and path *c*). If a person believes that she or he is competent in certain tasks or behaviors, in terms of her or his career or academic pursuit, and if, at the same time, she or he also believes that seeking these careers will result in desired outcomes, she or he is more likely to express interests in her or his academic or occupational pursuit. As a result of the interests formed, with which they feel competent, and can anticipate positive outcomes, they develop goals that can increase their engagement with those particular activities or behaviors (path *e*, *d*, and *f*). The determination to pursue goals, in turn, enhances the possibility to be involved in the activities (paths *g*, *h*, and *i*). Engagements in the selected activities or tasks generate certain levels of performance attainments (performance attainment, paths *j* and *l*). The achievements resulting from the activity involvements then produce a socio-cognitive feedback loop that revises self-efficacy and outcome expectations (source of self-efficacy and outcome expectations, path *k*). In particular, Lent et al. (1994, 2002) emphasize the functions of four core person-cognitive variables: (1) self-efficacy, (2) outcome expectation, (3) interest, and (4) goals. These core constructs not only interact with one another but also influence how individuals select and perform certain activities or tasks based on their career goals or intentions.

It is critical to have a clear understanding about each construct as dynamic and bidirectional interactions contribute to the socio-cognitive foundation of SCCT. Thus, the seven social cognitive constructs of the internal process will be explained in more detail in the subsequent sections.

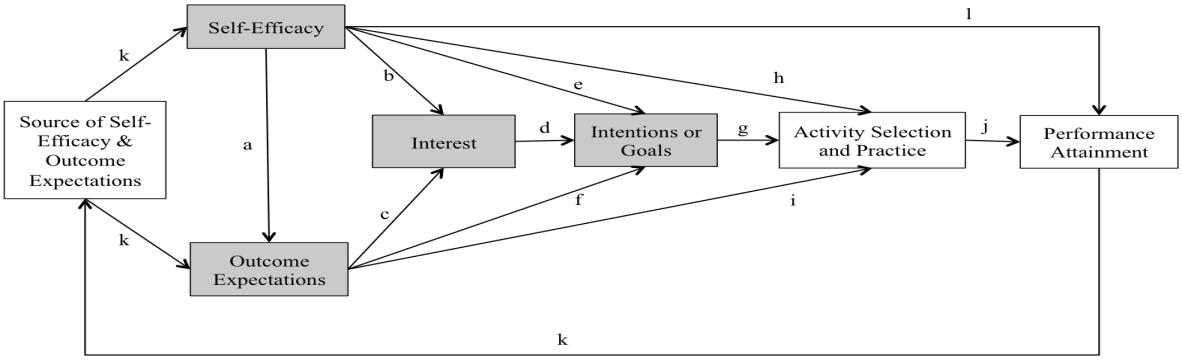

Figure 2.3. Cognitive-person process built on seven socio-cognitive variables within the framework of Social Cognitive Career Theory (modified from Lent, Brown, & Hackett, 1994)
Note: Grey color added to four key sociocognitive constructs for emphasis

Self-efficacy. As Bandura (1986) defined self-efficacy in his Social Cognitive Theory, SCCT also defines self-efficacy as individuals' beliefs concerning his or her capability to successfully perform a certain task or behavior (Bandura, 1977, 1986). Considering that "*can* is a judgment of capability; *will* is a statement of intention" (p.307, emphasis added), self-efficacy is mainly concerned about the concept of *can do* instead of *will do* (Bandura, 2006). For instance, an individual with a high self-efficacy belief regarding an activity or behavior are more likely to engage in those behaviors, while those who have lower self-efficacy beliefs are more likely to avoid those behaviors. Thus, self-efficacy is the most important mediator of behaviors and behavioral changes (Bandura, 1977; Betz & Luzzo, 1996; Choi et al., 2012; Lent et al., 2003).

Due to its importance for understanding and predicting individual's behaviors, self-efficacy beliefs have received extensive attention from the field of career development (Betz & Luzzo, 1996; Choi et al., 2012; Lent & Brown, 2006). Indeed, many researchers employing the

SCCT model confirmed that self-efficacy performs the central role in the career decision-making process (Betz, & Hackett, 1983; Choi et al, 2012; Lent et al., 2001; Lent et al., 2003).

Outcome expectations. In SCCT, outcome expectations indicate personal beliefs about "the consequences or the outcomes of performing particular behaviors" (Lent & Brown, 1996, p. 312). Outcome expectations vary, based on the focus of probable consequences, such as beliefs about self-directed outcomes (e.g., whether to fill them with pride when achieving a challenging task), external reinforcement (e.g., whether to receive tangible rewards as a result of successful performance), and outcomes acquired from the process of completing a particular activity (e.g., a sense of immersion in the activity itself, Lent et al., 2002). Moreover, outcome expectations can influence individual's behaviors in different directions and at varying degrees of strength (Lent & Brown, 2006). For example, individuals can believe that involvement in a particular activity leads to positive, negative, or neutral outcomes. Outcome expectations are considered to be a less influential determinant than self-efficacy in SCCT (Lent & Brown, 1996).

Interest. Interests are defined as "people's pattern of likes, dislikes, and indifferences regarding various occupations and career-relevant activities" (Lent et al., 2002, p. 264). In SCCT, career interest establishment is a positive and joint function of self-efficacy and outcome expectations. Specifically, SCCT states that people develop long-lasting interests in a certain activity when they believe that they are competent to perform it, and when they expect that the activity performance will yield desired outcomes (Bandura, 1986; Lent et al., 2002). Conversely, lower career interests are formed when people predict negative outcomes, and that they are incompetent to perform a given activity.

Goals or intentions. Personal goals in SCCT represent "one's determination or intention to pursue a particular course of action" (Lent et al., 2003, p.458). Personal goals or intentions are

established through individual's self-efficacy beliefs, outcome expectations, and enduring interests. Setting personal goals helps individuals exercise personal agency to organize, lead, and continue their behaviors over long periods of time, even without external encouragement or facilitation (Lent et al., 1994).

Activity Selection and Practice. Activity selection and practice indicates people's choice behaviors and intention to explore or implement a certain activity that leads toward chosen career choices (Lent at al., 1994). For example, an individual who is determined to pursue a graduate degree might participate in a graduate school fair or graduate school application workshop while taking the required exams to enter graduate school, such as the GRE. Since people have a tendency to become more committed to specific career goals rather than unclear, vague goals, they are more likely to be involve in these goals-related activities when their personal goals are specific, measureable, and challenging, but achievable (Lent et al., 1994). The more an individual values the perceived outcomes, and the more she or he is confident in his or her abilities, the more likely she or he will be to engage in particular actions to accomplish chosen career goals.

Performance attainment. Involvement in one's goal-related activity results in performance attainment. This particular experience is evaluated by the individual and based on the level of performance he or she perceives to achieve in his or her activity (e.g., the level of success or proficiency, Lent & Brown, 1996; Lent et al., 1994). When people do not possess the abilities required to achieve goal-related activities, or when they misunderstand their self-efficacy level, they are more likely to confront difficulties in performing those activities (Lent, et al., 1994).

Sources of self-efficacy and outcome expectations. As illustrated by path *k* in Figure 2.1, an individual's perceived outcome of subsequent performance attainments (either successes or failures) develops a feedback loop, affecting his or her self-efficacy, and outcome expectations for future career behaviors (Lent et al., 1994, 2002). Within this dynamic, an ever-evolving cycle of individual's cognitions and behaviors, an individual reconsiders what he or she is capable of, what he or she is interested in, and what career choices to pursue.

SCCT's cognitive-person process presents dynamic socio-cognitive mechanisms through which people regulate, change, and develop their own career-related behaviors (Lent, 2005, p. 103). However, it is critical to recognize that these sociocognitive variables (e.g., self-efficacy, outcome expectations, and goals) do not function in isolation from other important external influences (person and contextual sources). Personal and environmental variables are considered to influence both individual's cognitive variables and individual's career development processes (Lent et al., 1994, 2000, 2002). The following section examines SCCT's conceptualizations of the ways in which external factors interrelate with an individual's cognitive variables in the course of an individuals' career development.

SSCT's external forces through person and contextual variables. An individual's social cognitive variables do not operate alone when forming interest or career choices (Lent et al., 2002). According to SCCT, a number of other important personal (e.g., gender, race-ethnicity, and socioeconomic conditions) and contextual (social, cultural, and economic) variables also influence the career choice process (Lent et al., 1994, 2000, 2002). Lent et al. (1994) envisioned that these variables might "serve as [1] precursors of sociocognitive variables, [2] moderators of certain key theoretical relations, or [3] direct facilitators or deterrents (e.g., selection practices that restrict access to particular choice options)" (p.101). Figure 2.4 provides an overview of the

second layer of SCCT's theoretical analysis to understand how person-environmental factors interrelate with an individual's cognitive variables in the course of career development.

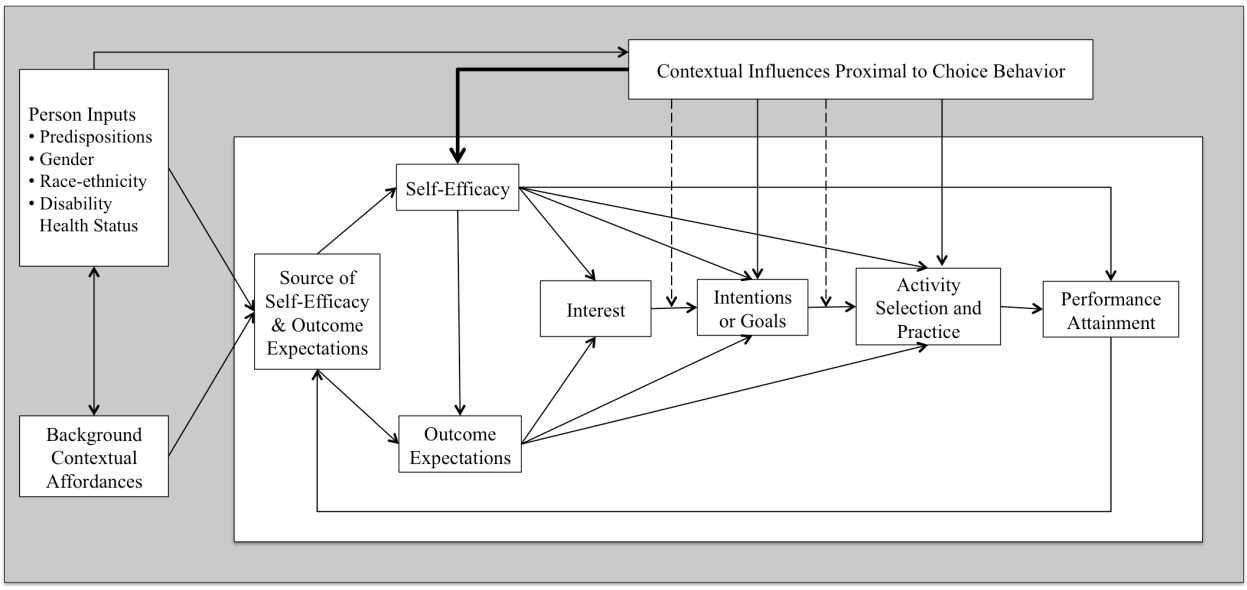

Figure 2.4. Cognitive-person process built on seven sociocognitive variables within the framework of Social Cognitive Career Theory (modified from Lent, Brown, & Hackett, 1994 and Lent, Brown, Schmidt, Brenner, Lyons, & Treistman, 2003)
Note: Grey color added for emphasis; direct relations between variables indicated with solid lines; moderating effects indicated with dashed lines; and recently supported direct relation between contextual factors and self-efficacy indicated with bold solid line.

To conceptualize environmental or contextual influences, it is important to recognize that SCCT was adapted from Astin's (1984) notion of the perceived "opportunity structure," and Vondracek, Lerner, and Schulenberg's (1986) concept of "contextual affordances" (Lent et al., 2000, p. 37). Both concepts highlight the active role that people play, in assessing and responding to what one's environment provides (e.g., resources, supports, opportunities, barriers, or affordances), and it also acknowledges the considerable influences of objective environmental factors (Lent et al., 2000). These concepts are consistent with the emphasis that SCCT places on the individual's personal agency mechanism for guiding one's career development behaviors (Lent et al., 2002).

Lent et al. (1994, 2002) categorize person-contextual variables into two contextual influences based on their relative proximity to the individual's career decision-making process: (1) distal background contextual influences, and (2) proximal influences. They provide positive, negative, or neutral impacts on people's career decision-making process (Lent et al., 2000).

Distal contextual influences. Distal contextual factors include both personal inputs and background contextual influences (shown at the left part of Figure 2.4) that help to shape individuals' career trajectories, through which social cognitive variables, such as self-efficacy and outcome expectations, develop.

Personal inputs indicate sources of individual differences besides sociocognitive variables (e.g., self-efficacy, outcome expectations, and interest). Individual differences caused by biological attributes, such as gender and race-ethnicity, are considered personal inputs in SCCT. Although individual's career development is related to individual's inherited biological characteristics per se, Lent et al. (1994, 2002) emphasize that much of their relation to career behaviors derives mostly from sociocultural environments in which an individual interacts, as well as from their relevance to structural opportunities, where career behavior occurs. Viewing gender and race-ethnicity as culturally and socially constructed concepts results from the interactions of social, cultural, and economic conditions with personal inputs (indicated by Figure 2-4). For example, such as gender and race-ethnic differences shape the unique contextual conditions since people from underprivileged backgrounds are more likely to experience the consequences of stereotypes, discrimination, and different role expectations, developing unique barriers to their career development (Cook, Heppner, & O'Brien, 2005).

Social, cultural, and economic contexts in which individuals interact are defined as background contextual affordances in SCCT. These "environmentally precipitated forces" (p.

105) to which individuals are exposed help to shape their career development processes over time (Lent et al., 1994). Examples of distal contextual influences include different opportunities for exposure to develop certain skills or interests based on gender (gender role socialization) and particular culturally preferred career options.

To summarize, as Figure 2.4 illustrates, personal inputs, such as gender and race-ethnicity, affects what types of learning opportunities that individuals are exposed to. Such opportunity structure influences individual self-efficacy and outcome expectations, which influence individual career interest, choice, and performance. (Lent et al., 2002).

Proximal contextual influences. Proximal contextual influences, conceptualized as either career barriers (obstacles) or environmental supports (facilitative effects), become particularly relevant during academic or career decision-making processes (Lent & Brown, 2006; Lent et al., 2000).

Career barriers are defined as "conditions, either within the person or in his or her environment, that make career progress difficult" (Swanson & Woike, 1997, p.446). Although people have high self-efficacy, high expectations for potential outcomes, or strong interest in a certain career, they often avoid a particular career choice if they perceive insurmountable obstacles to enter that career path (Brown & Lent, 1996). However, barriers are not always impenetrable, but, indeed, they may be overcome. Degrees of difficulty vary and are based on the specific types of barriers and characteristics of an individual (Swanson & Woike, 1997).

Environmental supports are viewed as environmental activities, conditions, or resources that facilitate career progress (Lent et al., 2000). Although environmental supports are essential components in the career choice process (Borgen & Maglio, 2007), they are often recognized as "a missing environmental ingredient" (p. 42) in career development literature (Lent et al., 2000).

Involvement or supports from significant others, such as parents, teachers, career counselors, and advisors, are examples of environmental supports. Career barriers and limited social or environmental supports are more likely to impede the process of career development than less career barriers and social or environmental supports (Lent et al., 2000; Lent et al., 2003).

As indicated by the solid-line paths from contextual influences to goals and career-related actions in Figure 2.4, these proximal contextual influences construct particular contextual conditions, providing direct, powerful impact on the formation and implementation of career goals (Lent et al., 2000, 2002). For example, people are more likely to translate their career interests into career goals, and goals into goal-related actions, when beneficial environmental conditions (e.g., few barriers and strong support systems) are perceived (Lent & Brown, 2006; Lent et al., 2000).

Due to the importance of contextual influences on career choice, researchers (Lent & Brown, 2006; Lent et al., 1994; Lent et al., 2001) called for more context-sensitive research to further elaborate the SCCT framework. Such empirical efforts to better understand the role of contextual variables promised to increase predictive relationships among other variables, thus providing assistance to practitioners as they try to identify what needs to be given focus and in order to design effective career interventions (Lent & Brown, 2006; Lent et al., 2001). However, a relatively limited body of research has been conducted to elaborate the influences of SCCT's personal and contextual factors on the career choice process when compared with the volume of research on the core socio-cognitive variables of SCCT (Lent et al., 2000; Lent et al., 2003; Raque-Bogdan et al., 2013).

Theory integration of CIP theory and SCCT. Since the early 1990s, an increasing number of scholars in the field of career development attended to the importance of theory

integration in an effort to embrace a large amount of accumulated empirical findings and variables describing how career decisions are made and implemented (e.g., Borgen, 1991; Hackett et al., 1991; Osipow, 1990; Super, 1992). Scholars expressed the value of incorporating various career theories, based on considerations of their commonalities, to increase the potential for obtaining a more comprehensive framework in order to better understand career decision making (Lent et al., 2002; Patton & McMahon, 2014). Specifically, theory convergence helps scholars to understand that a single theory, in itself, is not sufficient to adequately explain the complexities of career development (Osipow, 1990; Super, 1992). Moreover, the integrative framework may better assist career professionals to address career-related issues by gaining a more comprehensive perspective and broadening their viewpoints that, again, a single theory cannot adequately solve (Patton & McMahon, 2014).

To respond to a need for creating a comprehensive theoretical understanding of how career decisions are made and executed, several career theories (e.g., SCCT, CIP theory, Holland code) have been integrated to obtain a more complete understanding of the complex and dynamic mechanism of career decision making. Among them, CIP theory and SCCT are the theories frequently used in conjunction with other career theories (e.g. Lent, Brown, Nota, & Soresi, 2003; Tansley, Jome, Haase, & Martens, 2007; Thrift et al., 2012; Wright et al., 2014; Wright & Perrone, 2008). For example, Wright et al. (2013) integrated SCCT and attachment theory to better explain proximal contextual influences on individual career decisions and academic self-efficacy. Tansley et al. (2007) combined SCCT and prospect theory to better understand how written persuasive messages influenced participants' career decision-making self-efficacy. In addition to SCCT, Thrift et al. (2012) incorporated CIP theory and Holland's (1997) theory together to elaborate individuals' career options in the synthesis stage within CIP's CASVE

cycle. The usage of two theories for theory integration is due to the fact that those two theories were originally designed to help build useful conceptual scaffolding and to bridge certain aspects of existing career theories (Lent et al., 2002; Sampson et al., 2004).

In the field of career development, recent scholarly activities that focus on theory convergence endeavored to integrate CIP theory and SCCT (e.g., Bullock-Yowell, Andrews & Buzzetta, 2011; Bullock-Yowell et al., 2012; Paivandy, 2008). This choice was due to the commonalities observed between two theories in terms of theoretical viewpoint, theoretical constructs, and theorized outcomes. For example, Bullock-Yowell et al. (2012) focused on the common emphasis that CIP theory and SCCT placed on the core role of career beliefs in individuals' career-related behaviors. Their study used the CIP theory, as a dominating theory, to conceptualize individuals' career exploratory behaviors. This occurs in the analysis stage of the CIP's CASVE cycle, and it examines the effects of negative career thoughts (CIP theory) and career decision-making self-beliefs (SCCT). These are used to predict the successful engagement of exploratory behaviors in the analysis phase of the CASVE cycle. Bullock-Yowell et al. (2011) also incorporated SCCT and CIP theory, regarding their emphasis on career beliefs, to examine the role of dysfunctional career thinking in the relationship between personality and career decision-making self-efficacy.

Based on the theoretical characteristics of both CIP theory and SCCT, a social constructivist perspective influences these theoretical worldviews. The social constructivist perspective regards a career decision as a multifaceted and constantly changing process that is based on individuals' active reflection on their prior experiences as well as interactions with their environment (Savickas, 2000). Both CIP theory and SCCT are influenced by the constructivist approach, considering a strong emphasis that is placed on the role of individual's perceptions and

interpretation (e.g., self-efficacy in SCCT and self-talk in CIP theory) in career development. In other words, CIP theory and SCCT emphasize influences of individual cognitive factors (e.g., beliefs), and the individual perception of contextual factors, on the individual career decision-making process.

In terms of theoretical constructs, both theories conceptualize individual's career beliefs as influencing career goal setting, and eventually, behavioral outcomes in the career decision-making process (Bullock-Yowell et al., 2012; Paivandy, 2008). As discussed earlier, the executive processing domain of the CIP pyramid (self-talk, self-awareness, and monitor and control) serves a critical role in how an individual thinks, and subsequently takes action, in making a career decision (Sampson et al., 2004). Similarly, Lent et al. (1994, 2002) emphasize three core person-cognitive variables that construct the sociocognitive foundations of SCCT, including self-efficacy, outcome expectations, and intention (Bullock-Yowell et al., 2012). These key constructs influence how individuals select and perform certain activities or tasks to meet their career goals or intentions.

In addition, two theories also clearly indicated the role of contextual factors, such as support of significant others (e.g., parents), and prior experiences, which influence an individual's beliefs or cognitions in his or her capability to successfully perform career-related tasks. The CIP theory acknowledges the impact of environmental factors, such as family situations on all three domains of the CIP pyramid (knowledge of self and options, decision-making process, and cognitions) during the decision-making process (Sampson et al., 1999). In SCCT, environmental factors, including distal (e.g. race, gender) and proximal components (e.g., career barriers), affect individual's cognitive variables, including self-efficacy, outcome expectations, and intention (Lent et al., 1994).

Despite the similarities identified with the two theories, each approach presents different definitions of these cognitive variables, as indicated above. Also, the prior emphasis is slightly different. The CIP theory-based approach provides a more specific and concrete internal information processing structure (e.g., CASVE cycle) for understanding how an individual gathers, transforms, and applies information to make a career decision (Bullock-Yowell, et al., 2012; Sampson et al., 2004). This involves a five-phase cycle of communication, analysis, synthesis, valuing, and execution (CASVE cycle) to process information about career decisions (Sampson et al., 2004). Although CIP theory considers the influence of external factors, such as the influence of significant others on employment preferences in the knowledge domain, and the impact of job market situations on career option exploration, these environmental factors are not specifically presented in its theoretical framework. Rather, they are implicit in their cognitive decision-making process.

In contrast, SCCT conceptualizes ways in which external factors interrelate with individual's cognitive variables in the course of an individual's career development by envisioning distal (e.g., gender, ethnicity) and proximal (e.g., career-related barriers and supports) environmental forces in its theoretical framework. Thus, SCCT is considered to be a promising approach for understanding the effect of environmental forces on an individual's career decision-making process (Lent & Brown, 2013; Lent et al., 2000; Lent et al., 2003; Swanson et al., 1996). Regardless of these differences, both CIP theory and SCCT are considered to be effective theoretical frameworks for examining the processes through which people make and pursue career choices (Ali & McWhirter, 2005; Bullock-Yowell et al., 2012).

To summarize, these two theories are appropriate for theory convergence, to develop an integrative framework, as recommended by Hackett and Lent (1992). This is particularly true for

research, considering that each approach presents different aspects of the career decision-making process, and together, they offer a comprehensive view of career decision-making processes. As discussed earlier, a handful of studies (e.g., Bullock-Yowell et al., 2011; Bullock-Yowell et al, 2012) empirically demonstrated that combining the two theories could elaborate people's career-related behaviors regarding career decision making. However, the existing literature on theory convergence between CIP theory and SCCT mainly concentrated on understanding the role of people's career beliefs by examining both self-efficacy and negative career thoughts together. It is limited to provide a comprehensive understanding of how these two theories can be connected throughout the entire process through which an individual makes a career choice.

This study will combine the CIP theory and SCCT, as an effort to diminish the gap in CIP theory and SCCT integration, to better understand doctoral students' decision-making processes in a comprehensive manner. This study employs the CIP's CASVE cycle, as a dominant theory, to understand the career decision-making processes of doctoral students. Specifically, the CASVE cycle provides a specific, concrete and internal decision-making process, step-by-step, to understand how an individual gathers, transforms, and applies information to make a career decision. This information will be used to develop core interview questions to identify in detail how doctoral students make their own post-graduate career choices. However, the CIP theory-based approach does not explicitly frame how external factors (e.g., career barriers and supports) affect each phase of the career decision-making process. Although the CIP theory-based approach does recognize the impacts on individuals' cognitions and emotions during the decision-making process, the external factors are rather implicit in the framework. Therefore, SCCT is incorporated to more precisely capture environmental influence (e.g., career barriers).

In other words, through the lens of SCCT, this study enables a focus on the role of perceived environmental influences in the career decision-making process.

Empirical Findings Regarding Career Decision-Making Process

This section offers a comprehensive overview of the findings of existing empirical research from the perspective of the CIP theory or SCCT to investigate individuals' career decision making. Although both theories are actively used in order to understand people's career decision-making process, each theory's approach to conceptualize the process is slightly different. Specifically, CIP theory views a process of career decision as a sequence of key steps regarding what an individual engages in order to make a successful career decision that can maximize his or her abilities and is feasible to obtain (e.g., CASVE cycle). SCCT presents the career decision process based on how each construct interacts with another within its framework (e.g., SCCT's two levels of analysis: cognitive-person variables, cognitive-person variables).

Considering the different views of each theory on the career choice process and the different application of each theory in this study, findings from existing empirical studies on the influences of people's cognitions on their career choice are reviewed separately. The first section will cover the review of research on the CASVE decision-making cycle. The following two sections provide a comprehensive overview of the findings from empirical studies, grounded in SCCT perspective. Considering the scope of the current study, self-efficacy, outcome expectations, and interactions with contextual influences, regarding career choice, are examined primarily.

This overview of empirical studies on career decision-making process provides enriched empirical foundations to guide the review of studies on doctoral students' career choice, which are presented after this section.

Metacognitions regulate progress through the CASVE decision-making cycle. According to CIP theory, metacognitions (e.g., self-talk, self-awareness, and control and monitoring) are the most critical domain influencing the CASVE cycle because they influence the entire career decision-making process (Sampson et al., 2004; Thrift et al., 2012). In particular, Peterson and colleagues (2002) posited that negative or dysfunctional career thoughts could impair people's capacities to make a good career decision. In order to empirically measure such beliefs, the Career Thoughts Inventory (CTI) was created based on the elements of the CIP pyramid and the CASVE cycle (Sampson et al., 1996). The CTI assesses the extent to which an individual perceives negative career thoughts that prevent progress through the CASVE cycle (Sampson et al., 2004).

The CTI consists of three factors that reflect the CASVE cycle (Meyer-Griffith, Reardon, & Hartley, 2009). These include the following: (1) Decision Making Confusion (DMC), (2) Commitment Anxiety (CA), and (3) External Conflict (EC). DMC represents an individual's "inability to initiate or sustain the decision-making process" (p.92) because of a lack of understanding about the process of decision making itself and/or impaired emotions (Sampson et al., 2004). For example, individuals who are unable to integrate self-knowledge and occupational knowledge to create probable alternatives tend to have higher scores in the DMC (Thrift et al., 2012). This scale reflects communication, analysis, and synthesis phases of the CASVE cycle (Meyer-Griffith et al., 2009). CA reflects an individual's inability to commit to the implementation of a specific career choice because of "generalized anxiety" (p.92) or fear about the outcomes of making a career choice (Sampson et al., 2004). The CA scale reflects the valuing and execution phases (Meyer-Griffith et al., 2009). A third scale, EC, denotes an individual's inability to properly incorporate self-perceptions with significant others' input,

resulting in an unwillingness to take responsibility for choosing a primary career choice among probable alternatives (Sampson et al., 2004). This indicates a selected valuing phase within the CASVE cycle (Meyer-Griffith et al., 2009). Such thoughts can limit an individual's confidence or beliefs in his or her own decision-making skills, resulting in inadequate information processing during the phases of the CASVE cycle. Consequently, it also leads an individual to experience failure to make an appropriate career choice (Bullock-Yowell et al. 2012; Saunders, Peterson, Sampson, & Reardon, 2000).

Previous studies found that problematic beliefs measured by CTI significantly influence career constructs associated with the process of career pursuit. These include a lack of career exploration and commitment (Bullock-Yowell et al. 2012), low confidence in performing making decisions (Bullock-Yowell et al. 2012; Kim, Lee, Ha, Lee, & Lee, 2015; Sampson, Peterson, Lenz, Reardon, & Saunders, 1998), career indecision and depression (Saunders et al., 2000), and job avoidance behavior and job dissatisfaction (Judge & Locke, 1993). In order to be aligned with the purpose of the study, this section mainly discusses studies that examine how these cognitive perceptions influence the phases of the CASVE cycle.

A handful of empirical studies examined the influences of perceived negative thoughts on the career decision-making process. The majority of the identified studies employed a quantitative approach, often examining the extent to which the cognitive constructs of CIP theory affect engagement in the early phases of the CASVE cycle, such as the communication and analysis phases (e.g., Bullock-Yowell et al., 2012; Bullock-Yowell, McConnell, Schedin, 2014; Meyer-Griffith et al., 2009), or engagement in the phases related to making a decision, such as synthesis and valuing phases (e.g., Thrift et al., 2012). For example, Meyer-Griffith et al. (2009) proposed that individuals with high levels of communication apprehension were less likely to

effectively communicate their identified career gap, resulting in increasingly negative career beliefs. Ultimately, this would prevent them from seeking assistance or resources to move forward to the next phase of the career decision process. The study identified that, for a sample of 175 undergraduate students, participants with low levels of communication apprehension demonstrated significantly lower scores in all three types of negative thoughts compared with participants with average or high levels of communication apprehension. Particularly, negative perceptions in decision-making confusion (DMC) showed the largest differences, indicating that communication apprehension may prohibit an individual from seeking to share his or her career-related ideas and thoughts (Meyer-Griffith et al., 2009). These behaviors might lead to insufficient processing of information during the early phases of the career decision-making process (e.g., communication, analysis, and synthesis).

Similarly, Bullock-Yowell et al. (2014) identified that students, who did not declare a major, expressed high levels of overall negative career thinking in choosing a major because of inconsistent or lack of information, and not because of their readiness to make a choice. Bullock-Yowell et al.'s (2014) study empirically presented that lacking information can hinder understanding one's options (analysis phase), and subsequently, prevent the next steps, such as narrowing down probable options to make a choice (Sampson et al., 2004). Further examining the influence of negative cognitions, on engaging in career exploratory behaviors, in the analysis phase of the CASVE cycle, Bullock-Yowell et al. (2012) found that negative career thoughts negatively affected individuals' confidence in performing career related problem-solving tasks, which in turn, influenced career exploratory behaviors.

In addition to the early phases of the CASVE cycle, Thrift et al. (2012) conducted quasi-experimental research in their sample of 128 undergraduate college students to examine the

changes in their problematic career thoughts regarding the creation of alternatives and making a career choice as a result of career interventions. Specifically, they designed two types of career interventions consisting of activities that facilitate participants to create alternatives and choose an occupation (*synthesis* and *valuing* phases). They assigned participants to three groups (two treatment groups and one control group). At the time of the post-test, the results revealed that only participants who received career interventions showed a significant decrease (p's < .005) in confusion on identifying career options and making a choice (*career making confusion* DMC scale) as well as in levels of anxiety regarding the implementation of their chosen occupation (*commitment anxiety, CA* scale). Interestingly, the subscale on commitment anxiety showed the largest pretest–posttest effect sizes (*d= .73* and *.44* for each intervention), even though the interventions mainly focused on activities to reduce participants' career making confusion (*d= .44* and *.44*). This finding indicated that resolving negative thoughts in a certain phase could diminish such thoughts in other phases (Thrift et al., 2012), empirically supporting the theoretically proposed cyclical nature of the CASVE cycle.

Synthesis. This set of studies provides empirical evidence to assert that metacognitions regulate progress through the CASVE decision-making cycle. In particular, problematic beliefs or thoughts impair the progress of the career decision-making process, and such thoughts manifest themselves in a variety of ways and at various phases of the career decision-making process (Sampson et al., 2004; Thrift et al., 2012). However, the existing studies are limited for providing an in-depth understanding of the entire process through which an individual makes a career choice and implements his or her chosen choice as the CASVE cycle describes. This is because the existing literature concentrated on a certain phase of the decision-making process with a strong emphasis on a quantitative approach. For example, Meyer-Griffith et al. (2009)

solely focused on the communication phase in the CASVE cycle. Thus, qualitative research is greatly needed for a complete understanding of the entire career decision-making process by investigating all phases of the CASVE cycle step-by-step. This comprehensive and in-depth understanding derived by the qualitative approach would provide an opportunity to: (1) better clarify the complex career decision-making process, and (2) identify areas requiring more attention by researchers and career specialists to help individuals make an informed career choice.

Self-efficacy is a central determinant of individual's career behaviors. After Hackett and Betz (1981) first introduced the possibility to extend Bandura's self-efficacy theory to career-related behaviors (Lent, Larkin, & Brown, 1989), especially women's career development, ensuing studies confirmed its applicability to understand a variety of career-related behaviors in both men and women (e.g., Betz & Hackett, 1981; Lent et al., 1989; Rotberg, Brown, & Ware, 1987). Numerous studies, using the SCCT framework, demonstrated that career self-efficacy plays a key role in an individual's career planning and development (Byars-Winston & Fouad, 2008; Choi et al, 2012; Lent et al., 2001; Lent et al., 2003; Lent et al., 2008).

Advances in research on career choice, especially applying SCCT, led to a need for distinguishing self-efficacy based on its distinctive domains of career activities (Betz & Luzzo, 1996; Choi et al., 2012; Hackett & Betz, 1981; Lent & Brown, 2006). Because self-efficacy "is not a unitary or global trait, like self-esteem. . . . [but] a dynamic set of self-beliefs that are linked to particular performance domains and activities" (Lent, 2005, p. 104), self-efficacy scales should "be tailored to activity domains and assess the multifaceted ways in which efficacy beliefs operate within the selected activity domain." (Bandura, 2006, p. 310). The following section provides an overview of the distinct types of self-efficacy that previous studies employed.

An examination will follow on how self-efficacy interacts with other cognitive variables within the internal process functions of SCCT.

Two unique domains of self-efficacy: Content and process self-efficacy. Hackett and Betz (1981) initially proposed two distinctive domains of self-efficacy: the content and process domains of career choice (Betz & Luzzo, 1996; Choi et al., 2012; Lent & Brown, 2006). The *content domain of career-related self-efficacy* refers to self-efficacy regarding a specific content area, or career field (Betz & Luzzo, 1996). On the other hand, *the process domain of self-efficacy* measures an individual's ability to accomplish strategies necessary to successfully navigate a career decision-making process (Betz & Luzzo, 1996; Lent & Brown, 2006).

To date, a large volume of empirical research developed and employed content specific self-efficacy to measure individuals' confidence in their abilities in the following areas: (1) to perform research (Phillips & Russell, 1994), (2) enter a certain career field or occupation (Betz & Hackett, 1981; Cunningham, Bruening, Sartore, Sagas, & Fink, 2005), and (3) complete tasks required in various academic domains, such as mathematics (Byars-Winston & Fouad, 2008), engineering (Lent et al., 2003), or sciences (Deemer, Thoman, Chase, & Smith, 2014). For example, in order to examine students' intentions to pursue sports and leisure-related industries, Cunningham et al. (2005) asked 197 undergraduate students from four universities to rate their perceived self-efficacy to enter the sport and leisure industry.

On the other hand, a handful of empirical studies examined the process domain of self-efficacy measures. While several types of process self-efficacy were created and used in past studies, such as the job search process (Solberg, Good, Nord, Holm, Hohner, Zima, Heffernan, & Malen, 1994), career decision-making self-efficacy (CDMSE), which is defined as "an individual's degree of belief that he or she can successfully complete the tasks necessary to

making career decisions" (Betz et al., 1996, p. 48), received the most interest from researchers in career development literature (Betz & Luzzo, 1996; Choi et al., 2012). The most commonly used instrument to assess CDMSE is the Career Decision Self-Efficacy Scale (CDSE Scale; Betz & Taylor, 2001), which provides insights for how an individual perceives his or her personal abilities regarding the process of making academic and career choices. Table 2.2 provides an overview of what self-efficacy measures in each domain (process or content) have been employed in previous studies to understand career choice behaviors.

Table 2.2

Self-efficacy Measures in Content and Process Domains

Domain	Self-efficacy measure	Literature
Content	Self-efficacy for occupations or tasks in certain occupation areas	Betz and Hackett, 1981; Nauta, Kahn, Angell, and Cantarelli, 2002; Rotberg et al., 1987; Smith, 2001
	Math/science self-efficacy	Byars-Winston and Fouad, 2008; Luzzo et al., 1999
	Mathematics course self-efficacy	Lent et al., 2001
	Science self-efficacy	Deemer et al., 2014; Lent et al., 1989
	Engineering self-efficacy	Lent et al., 2003
	Self-efficacy for academic milestone for engineering major	Lent et al., 2008
	Self-efficacy to enter the sports and leisure industry	Cunningham et al., 2005
	Academic or student self-efficacy	Quimby & O'Brien, 2004; Wright et al., 2014
Process	Career decision self-efficacy	Choi et al., 2012; Huang and Hsieh, 2011; Quimby and O'Brien, 2004; Restubog, Florentino, and Garcia, 2010; Thompson and Subich, 2006; Wright et al., 2014;

The role of self-efficacy relative to other person-cognitive variables. Results of the current empirical studies provided strong supports for the relationships of self-efficacy with other person-cognitive variables, as proposed by SCCT. In particular, this includes the role of self-efficacy relative to interest and choice goals (Cunningham et al., 2005; Lent et al., 2003; Lent et al., 2008; Nauta et al., 2002; Smith, 2001). For example, Smith's (2001) test of SCCT, with 289 participants, performed by path analysis, indicated perceived self-efficacy yielded a statistically significant path to vocational interest (β = .51) and career choice goals (β = .22) at the .01 level. Self-efficacy accounted for 27% of the variance in interest and 34% in career choice goals. A later path analysis study, conducted by Lent et al. (2003), with 328 college students also found that self-efficacy produced a significant path to interests as well as direct and indirect paths toward goals.

Further examining the causal relationships, Luzzo et al. (1999) found no immediate effect of enhanced self-efficacy on math/science-related career interest, but participants who received the treatment reported higher levels of math/science-related career interests four weeks later. More recently, Lent et al. (2008) conducted a longitudinal study to examine changes of the internal process of SCCT at two points in time, which were five months apart. Findings derived from 209 participants in an engineering class showed that self-efficacy produced significant and lagged paths to outcome expectations, interest, and goals.

Mixed picture of the role of outcome expectations. According to SCCT, outcome expectations are also viewed as another key component, along with self-efficacy in SCCT, considering its importance in explaining career interests, choices, and performances (Lent et al., 1994, 2000). However, research to date has not given as much attention to outcome expectations as compared to self-efficacy.

Although a existing few studies found that self-efficacy strongly influenced outcome expectations (Byars-Winston & Fouad, 2008; Lent et al., 2003), several empirical studies indicated inconsistent findings of what SCCT posits regarding the core role of outcome expectations in terms of interest and goal development (Lent et al., 2003; Lent al., 2008; Smith, 2001). For example, Smith (2001) reported no significant relationship between self-efficacy and outcome expectations, suggesting that obtaining high career self-efficacy does not always ensure an increase in one's beliefs toward positive career outcomes.

In addition to the relationship between self-efficacy and outcome exceptions, for example, Lent et al. (2003) found a strong path from engineering self-efficacy to engineering outcome expectations, while outcome expectations were not found to yield additional significant effects on interests and goals beyond self-efficacy. Lent et al.'s (2008) longitudinal study reported a similar finding, showing that outcome expectations did not produce significant lagged paths to interests or goals. These studies are contrary to previous studies that demonstrated self-efficacy and outcome expectations as jointly predictive of interests and choice intention (e.g., Cunningham et al., 2005; Lent et al., 2001).

Synthesis. As can be gleaned from the previous discussion, ample research evidence exists to support the key role that self-efficacy plays in an individual's career decision. As noted by Betz (2004), over 30 years of studies demonstrated that self-efficacy does significantly influence people's career choices. Specifically, various types of self-efficacy measures used in the reviewed studies did tailor to the specific performance area of interest, addressing the previous concerns raised by Lent and Brown (2006) regarding the usage of ill-matched self-efficacy measures that have little relevance to "the particular domain of functioning that is the object of interest" (Bandura, 1995, p.1). Moreover, process-oriented self-efficacy measures

received limited attention in career research even though it has a great potential to illuminate how people make career decisions (Lent & Brown, 2006), regardless of the specific types of academic or career choices that people make.

Despite the consistent and ample evidence to demonstrate the role of self-efficacy as SCCT posits, and the usage of valid measures of self-efficacy, much remains to be understood about the functions of outcome expectations, due to the inconsistent findings and limited number of research studies. The unclear role of outcome expectations might be partially due to the absence of sufficient and pre-established research instruments of outcome expectations (Fouad & Guillen, 2006; ISIK, 2013). Further, as Bandura (1986) noted, individuals often avoid taking action associated with potential positive career outcomes when they perceive insurmountable barriers or if they fear incompetence. Investigating the influences of contextual factors (e.g., barriers) may provide valuable insights on these unexpected findings. This will be discussed in the following section.

Contextual factors directly influence career decision-making process. A number of empirical studies examined the effects of person and environmental factors on career choice. Although SCCT posits the indirect relationship between distal variables (e.g., gender, social status) and person-cognitive variables, some studies examined the direct effects. These findings showed inconsistent and mixed findings. In addition to the distal (background) contextual influences, a number of recent empirical studies focused participants' perceptions of proximal contextual influences (e.g., career barriers, social supports) on career choice as responding to a call for research to clarify the dynamic nature of proximal contextual influences on the career choice process (Lent et al., 2000; Lent et al., 2001), which will be discussed in this section. This

is followed by a discussion of proximal contextual variables, which have often been requested for further examination in the field of career development (Choi et al., 2012; Lent et al., 2000).

Gender and social status influence career decision-making process. Gender role and cultural socialization prescribe that certain activities are more appropriate to a certain gender (Eccles, 1994, Hackett & Betz, 1981). Thus, women and men tend to experience different types of activities, resulting in gender differences in self-efficacy on certain tasks. Ultimately, these differences hinder or facilitate individuals to pursue certain career paths based on gender (Lent et al., 2002). Although SCCT posits its indirect influence of gender on self-efficacy, a handful of studies indicated direct effects. For example, Betz and Hackett's (1981) study on gender differences in career choice found significant differences in their perceived self-efficacy despite no gender differences in level of abilities and skills. Specifically, female participants reported significantly higher levels of self-efficacy in traditionally female-dominated occupations than non-traditional occupations, while male participants showed high self-efficacy for both types of occupations.

Similarly, the path model examined in Smith's (2001) study with 289 participants significantly supported a link between career self-efficacy and gender. Specifically, female students felt less confident in completing the educational requirements to enter the given professions than did male students. In addition to self-efficacy, Smith (2001) found that females considered fewer occupations and reported less interest in the occupations.

In addition to the direct effects of gender on cognitive variables in SCCT, two recent studies identified that social status also generated direct effects on self-efficacy. Thompson and Subich (2006) examined the effects of social status on people's confidence in making a career decision by using 174 undergraduate students. They conceptualized social status as a

multidimensional factor and categorized it into three variables, including social power, social prestige, and economic resources. They found that social status predicted participants' perceived self-efficacy in making a career decision. Specifically, participants who perceived higher degrees of social power, social prestige, and economic resources, showed greater confidence in their capabilities to complete tasks necessary to make a career choice. In their sample of 738 college students, Huang and Hsieh (2011) also found that socioeconomic status (SES), assessed parents' education levels, and occupations, significantly influenced career decision-making self-efficacy.

Direct effects of proximal contextual variables on career decision-making process. Ample empirical support exists to assert that proximal contextual factors, including career barriers and environmental supports, are key constructs during the active phases of career decision-making (Byars-Winston & Fouad, 2008; Lent et al., 2003, Lent et al. 2008; Quimby & O'Brien, 2004; Wright et al., 2014).

As discussed earlier, SCCT specifically posits a direct paths model, describing that perceived proximal supports and barriers yield direct paths to choice goals and actions (Lent et al., 1994). In order to verify the hypotheses proposed by the SCCT model, regarding the role of perceived proximal contextual influences (e.g., supports and barriers), Lent et al. (2001) conducted an initial empirical study. From the data collected from 111 undergraduate students, the study employed six scales of Career Barrier Inventory-Revised (CBI-R, Swanson et al., 1996) to assess how likely participants were to perceive that they would encounter barriers, including social or family influences and financial concerns. Social encouragement and mentor availability were employed to measure perceived supports. Results demonstrated strong supports for a model, portraying supports and barriers, as indirectly linked to career choice through self-efficacy.

In 2003, Lent and colleagues (2003) again replicated the study and results of the path analyses and, again, indicated that SCCT's original model did not produce adequate fit indices. Both supports and barriers yielded the significant direct path to self-efficacy. Supports and barriers together explained 56% of the variance in self- efficacy, demonstrating that supports and barriers play a prominent role in affecting self-efficacy directly. After two initial empirical studies on the direct effects of proximal contextual variables on self-efficacy, a growing number of empirical studies examined and found more support for an alternative model, portraying both contextual supports and career barriers as directly linked to self-efficacy (e.g., Byars-Winston & Fouad, 2008; Cunningham et al., 2005; Wright et al., 2014). For instance, Byars-Winston & Fouad (2008) examined how parental involvement and perceived career barriers influenced college students' math/science career behaviors to better understand the contribution of proximal contextual forces. Their study found that parent involvement indirectly influenced interests in science and math through self-efficacy and outcome expectations.

Although previous studies on the role of proximal contextual variables (e.g., Lent et al., 2001; Lent et al., 2003) shed light on another possible explanation of the influences of career barriers and supports on career choice (e.g., direct effects on self-efficacy), Lent et al. (2001) and Lent et al. (2003) both noted that they employed barriers and supports from a general perspective by using aggregate environmental scores, rather than examining the effects of specific categories of supports (e.g., parent supports, availability of mentors) or career barriers (e.g., gender discrimination, multiple-role conflict). Thus, those findings are limited, regarding an understanding of what specific barriers and supports are more critical for understanding how people make career choices. This is because the usage of the aggregate scores masked this effect (Lent et al., 2003). Lent et al. (2001) and Lent et al. (2003) called for further research to examine

the dimensionality of the proximal contextual barriers and supports to obtain a precise understanding of how particular types of supports and barriers impact career choice.

As a response to such a call, a variety of instruments were employed to assess the effects of particular types of career barriers, or environmental supports, rather than overall environmental scores (e.g., Cunningham et al., 2005; Deemer et al., 2014; ISIK, 2013; Quimby & O'Brien, 2004). For example, Cunningham et al. (2005) measured discrimination and advancement opportunities to assess the perceptions of career barriers, human capital, and social capital to assess supports for examining college students' intentions to pursue careers in sport and leisure industries. Consistent with previous research (e.g., Lent et al., 2003), Cunningham et al. (2005) found that the perceived barriers and supports influenced self-efficacy directly, as opposed to directly affecting interests and goals. His or her perceived career barriers or supports influenced an individual's self-efficacy, which in turn, influenced career interests and goals. Specifically, as predicted, both expectations of discrimination ($\beta = -.15$, $p < .05$), and perceived lack of advancement opportunities ($\beta = -.28$, $p < .05$) yielded significant, negative effects on self-efficacy. Only human capital was significantly associated with self-efficacy ($\beta = .43$, $p < .05$).

In addition to the traditional college students' perceptions, Quimby & O'Brien (2004) examined the effects of career barriers and supports on nontraditional college women's career development. They divided participants into two groups (women who had at least one child, and women with no children) to compare the effect of childcare on this population's career development. By using the CBI-R (Swanson et al., 1996) to measure perceived barriers and the Social Provision Scale (Cutrona & Russell, 1987) to measure social supports, they examined the direct effect of proximal contextual variables on nontraditional women's self-efficacy in career

decision making. They found that social supports played a stronger role in participants' perceptions of self-efficacy on career decision making than did perceived career barriers. As a result of the analyses of each sub-scale of barriers and supports, they found that each group perceived different types of barriers as significant predictors of their perceived confidence in completing tasks necessary to make a career choice. Multiple role conflict provided a significant negative effect on the self-efficacy of women with children and conflict between children and career demands for women without children. As for social supports, women with greater perceived social supports, regarding recognition of their skills and competences, showed strong levels of career decision-making self-efficacy for both groups.

Recently, Deemer et al., (2014) gave special attention to stereotype threats as a specific type of career barriers, tailored to the situation for women studying in science laboratory class settings, rather than employing commonly-used career barriers instruments, such as the CBI-R (Swanson et al., 1996) or the Perception of Barriers Scale (POB, Luzzo & McWhirter, 2001). Specifically, they posited that female students who perceived unfavorable impressions of the sciences, as a result of identity-threatening experiences through the interactions with male students, were more likely to obtain confidence in completing science-related tasks and less likely to engage in science related research, which may lead them to avoid science career paths. In their sample of 439 female students, enrolled in chemistry and physics laboratory classes, Deemer et al. (2014) found that stereotype threat provided a negative effect on female students' science career pursuit indirectly through self-efficacy. Tables 2.3 and 2.4 provide an overview of the measures and analysis approaches used in this collection of literature to assess career barriers and supports.

Table 2.3

Measures to Assess Career Barriers and Their Effect on Self-efficacy

Reference	Measure Used to Assess Career Barriers	Analysis Approach	Effect on Self-efficacy
Byars-Winston and Fouad, 2008	Self-modified Career Barriers Inventory (CBI, Swanson & Tokar, 1991): *Likelihood*	Aggregate scores	Direct (negative)
Cunningham et al., 2005	Discrimination and advancement opportunities (self-developed measure)	Examining specific types barriers	Direct (negative, both types)
Deemer et al., 2014	Stereotype Threat (Marx & Goff, 2005)	Examining specific type of barriers	Direct (negative)
Lent et al., 2001	Math- and science-related barriers (self-developed measure)	Aggregate scores	Direct (negative)
Lent et al., 2003	Barrier to pursue an engineering major (modified measure of Lent et al., 2001)	Aggregate scores	Direct (negative)
Quimby and O'Brien, 2004	Eight subscales of Career Barriers Inventory-Revised (CBI-R, Swanson et al., 1996)	Examining specific types of barriers	Direct (negative, 4 out of 8 subscales)
Smith, 2001	For subscales of Career Barriers Inventory (CBI, Swanson & Tokar, 1991): *Likelihood*	Aggregate scores	Indirect via gender (negative)
Wright et al., 2014	Two subscales of Perception of Barriers-Modified (POB-M, Luzzo & McWhirter, 2001)	Aggregate scores	Direct (negative)

Table 2.4

Measures to Assess Supports and Their Effect on Self-efficacy

Reference	Measure Used to Assess Supports	Analysis Approach	Effect on Self-efficacy
Byars-Winston and Fouad, 2008	Parental Involvement Scale (Ferry, Fouad, & Smith, 2000).	Examining specific type of supports	Direct (positive)
Cunningham et al., 2005	Human capital and social capital (self-developed measure)	Examining specific types of supports	Direct (positive, only human capital)
Lent et al., 2001	Math- and science-related supports (self-developed measure)	Aggregate scores	Direct (positive)
Lent et al., 2003	Supports to pursue an engineering major (modified measure of Lent et al., 2001)	Aggregate scores	Direct (positive)
Quimby and O'Brien, 2004	Social Provisions Scales (SPS, Cutrona & Russell, 1987)	Examining each type of supports	Direct (positive, 4 out of 6 subscales)
Restubog et al., 2010	Number of career counseling sessions received and Career-Related Parent Support Scale (CRPSS, Turner, Alliman-Brissett, Lapan, Udipi, & Ergun, 2003)	Examining each type of supports	Direct (positive)
Wright et al., 2014	UCLA (University of California, Los Angeles) Loneliness Scale–Version 3 (UCLA-3; Russell, 1996) and Social Support Questionnaire–Short Form (SSQ-SF; Sarason, Sarason, Shearin, & Pierce, 1987)	Aggregate scores	Direct (positive)

Proximal contextual variables exhibit the direct effects on outcome expectations. In an effort to respond to the call for further research on the effects of outcome expectations (Fouad & Guillen, 2006; Lent et al., 2000), ISIK (2013) investigated the relationship between vocational outcome expectations and perceived social supports from family, friends, and significant others. The findings revealed that only family supports from other social support sources provided a significantly positive influence on participants' perceived vocational outcome expectations.

Similarly, Byars-Winston and Fouad (2008) also reported that parental involvement directly predicted, to a larger degree, participants' outcome expectations, more so than self-efficacy. This may suggest that parental encouragement and expectations might perform as one external source, enabling participants to acquire strong positive expected outcomes. More research is needed to provide empirical insight to facilitate a more complete understanding of this relationship.

Synthesis. Much empirical research evidence exists, regarding the role of contextual variables in the individual's cognitions during the active phase of career decision, especially in self-efficacy and outcome expectations. Specifically, this collection of literature reviewed showed that the contextual forces influenced self-efficacy. However, the generalization of this direct effect of contextual influences requires careful caution, as the majority of the research populations were limited to college students, except for the study conducted by Quimby & O'Brien (2004). Future research, examining different research populations, such as students from different educational levels (e.g., graduate students, Lent et al., 2001), or adults working in organizations, is needed for a better generalizability of the direct effects of contextual variables.

Moreover, this review again revealed the lack of attention to outcome expectations in research, to date, relative to contextual influences, despite its critical role in predicting career

choice, as proposed in the SCCT framework. In particular, as the intriguing finding from Byars-Winston and Fouad (2008) indicated, certain types of supports or barriers might be more strongly related to outcome expectations than self-efficacy.

Numerous studies found in this collection of literature examined various barriers and supports in relation to individuals' career attitudes and behaviors, which can be considered as responses to a call for research on the role of career barriers and supports within SCCT (Lent et al., 2000; Lent et al., 2001). However, still, many studies to date commonly employ the aggregate score of career barriers or environmental supports, hindering an understanding of what specific types of barriers and supports are more influential than others. This approach also limits a potentially deeper comprehension of the relationship between career barriers and environmental supports.

Considering the multidimensional nature of contextual barriers and supports measures (Cunningham et al., 2005; Lent et al., 2003), investigating the influences of specific types of environmental factors offers a more "fine-grained" (p. 125) understanding (Cunningham et al., 2005). Significantly, it is important to assess specific types of barriers or supports tailored to the particular condition or situation confronting career progress of the population of interest (e.g., Deemer et al., 2014). For example, in examining women's career pursuit in science fields, Deemer et al. (2014) considered the particular condition that female students in physics and chemistry majors experience, while interacting with male students, and they used stereotype threat as a career barrier rather than measuring general academic domain career barriers (e.g., career barriers to pursue science career).

Empirical Findings Regarding Doctoral Students' Career Decision Making

The discussion of literature thus far demonstrated that the bulk of research examines how college students make academic or career decisions. As mentioned earlier, there was one study in this collection of literature examining non-traditional college women students (Quimby & O'Brien, 2004), but the context of this study was still within the undergraduate education level. Thus, the earlier discussion is limited to obtain the current understanding of strengths and limitations of current research in terms of doctoral students' career decision-making. This section provides a comprehensive overview of empirical research findings on doctoral students' career decision-making.

Studies on doctorates careers began with placement surveys. Due to the increasing discrepancy between how doctoral students are trained and the careers in which they become involved, doctoral students' career development and placement issues received attention from higher education institutions and other stakeholders since the early 1990s (Allum et al., 2014). Since then, a growing number of researchers and institutions focus on identifying ways to help doctoral students to better prepare for their careers.

Large institutions, such as the National Science Foundation (NSF) and Council of Graduate Schools, performed the majority of the work. They assessed the initial employment outcomes for those who earn doctoral degrees in an effort to understand career pathways, such as Early Career Doctorates Survey, and the Survey of Doctoral Recipients and the Survey of Earned Doctorates (Allum et al., 2014). For example, the national report (NSF, 2015) based on the data from Survey of Earned Doctorates provided which fields attracted female or minority doctoral recipients, their first postgraduate positions and locations, and characteristics of first-generation doctoral recipients. Although these studies offer valuable insight for the possible career paths

that doctoral students can pursue and the demographic differences of each career path, these placement outcome studies provide little information on doctoral gradates' own career-related experiences during their program, such as internal and environmental interactions that influence career interest formation and career choices. In addition to these placement surveys, relatively few studies aimed to understand doctoral students' career-related experiences, which are discussed in detail in the following section.

Critical competencies for different career paths. Due to the supply/demand imbalance of the traditional career path, doctoral students need to prepare for a variety of careers beyond a faculty career path (Nerad, 2010). Such preparedness requires more diverse competencies that were not traditionally developed in doctoral programs (Lee et al., 2010; Nerad, 2010; Rudd et al., 2008). To identify important competencies among different career types, Rudd et al. (2008) conducted an empirical study of more than 3,000 social science doctorate recipients from 65 U.S. universities. Critical thinking, data analysis, and synthesis skills were reported as critical competencies equally required in faculty and non-faculty careers. However, PhDs in non-faculty careers more so emphasized the importance of abilities to work with diverse group of people as a team and to work within interdisciplinary contexts. Also, they found that competencies with managing people and budgets were considered more critical for non-faculty careers.

Lee et al. (2010) also conducted a similar study but focused on sciences and engineering doctoral holders in the UK. With 120 responding participants holding science and engineering PhDs, they found that knowledge and skills directly linked to mastering the doctorates' subject areas were regarded as the most important PhD competence in traditional careers, such as faculty positions. Participants employed in non-faculty careers, however, selected more general and

transferable skills, such as problem solving abilities, analytical skills, and project management skills as more valuable PhD competencies for their careers.

Both of the aforementioned studies offer strong empirical evidence to demonstrate that enhanced employability requires diverse transferrable competencies beyond an in-depth knowledge in one's field and research skills during doctoral training, especially as non-faculty careers become more prevalent. Such studies emphasized the importance of building doctoral students' capacity to transform their passion and interests into satisfying and productive professional careers (Rudd & Nerad, 2015).

Characteristics or factors influencing career choice. Studies in this section mainly examined factors influencing doctoral students to pursue a certain career, especially for traditional academic faculty careers based on doctoral students' experiences. Unlike previous studies on competencies, a greater variety in methodological approaches is applied, such as case study, semi-structured interviews, narrative approaches, and surveys.

Various factors were identified, such as perceived research training environment, students' personality, research interest, self-efficacy in conducting research, student early career aspiration to pursue a faculty career, and work and life balance. Among them, perceptions of the research-training environment, especially doctoral students' faculty advisor relationship, was identified as the most frequently reported factor that influences doctoral students' career choice, especially for a faculty career (Dabney & Tai, 2013; Fuhrmann et al., 2011; Hill, 1997; Luebs, Fredrickson, Hyon, & Samraj, 1998).

Through an advisor's guidance and encouragement (to be involved in various academic activities, such as conferences, and review) during the early stages of the program, doctoral students were more likely to build career interests in a faculty career (Luebs et al., 1998). This

finding was consistent with previous studies on the role of advisors and doctoral students' relationships (e.g., Clark, Murdock, & Koetting, 2009; Russo 2011; Schlosser & Gelso, 2001).

The faculty advisor is considered the most critical person with whom doctoral students interact during the process of their doctoral degree completion (West et al., 2011). The literature on doctoral advising demonstrated the direct, central impact of an advisor on doctoral students' success (Russo 2011), such as number of publications, presentations, and degree progress (Lunsford, 2012; West et al., 2011). Specifically, faculty advisors provide various developmental and learning opportunities to their advisees so that they are prepared to actively engage in scholarly activities and become part of their disciplinary communities (Barnes & Austin, 2009; West et al., 2011). However, faculty role modeling does not always provide a positive impact on graduate students' perceptions of a faculty career path. For example, Fuhrmann et al. (2011) found that respondents planning to pursue non-faculty careers reported that they decided not to pursue faculty careers due to the expected stress or competition and insufficient work-life balance, which they variously learned from their faculty advisors. Dabney and Tai (2013) also found that the anticipated conflict in balancing career and personal life influenced respondents' future career aspirations. By observing their advisors, some respondents realized that faculty life at the university did not reflect the ideal balanced lifestyle they expected.

Research also found that doctoral students' career choices were influenced by the employment outcomes of recent doctorates recipients. Fox and Stephan (2001) analyzed career prospects of doctoral students in science and engineering fields and found that current doctoral students were more likely to report that their career prospects looked promising in the sector where recent doctorate recipients were most likely to be employed (e.g., non-academic careers).

They concluded that doctoral students might decide to pursue career paths based, to some extent, on their perceptions of the feasibility of particular career opportunities.

These studies recognize doctoral students' career choices are closely influenced by how they interact with their environment, especially with faculty advisors during their training (Dabney & Tai, 2013; Fuhrmann et al., 2011; Hill, 1997). However, it should be considered that their chosen career path, as a result of strong mentoring by faculty and a high level of self-efficacy, could be modified by perceived negative prospects for career development (Fox & Stephan, 2001).

Doctoral students' career interest-formation process. Recent studies on doctoral students' career choice move beyond identifying influential factors to doctoral students' career choices by applying theoretical frameworks (e.g., mentoring, SCCT) to examine the underlying processes through which they form career interests for pursuing a faculty career. Two studies identified in this collection of the review employed SCCT as a theoretical framework. With a quantitative approach, Curtin et al. (2016) specifically focused on the effects of faculty mentoring in the process of developing doctoral students' career interests in pursuing a faculty career during their early stages. Gibbs and Griffin (2013) applied a qualitative approach to seek to understand overall doctoral students' career-interest formation processes based on the doctoral recipients' previous experiences during their program.

Drawing on SCCT, Curtin and colleagues (2016) framed the faculty advisors as mentors, who act as contextual supports, shaping doctoral students' career interest in a faculty career path. With a sample size of 848 early-stage doctoral students from various disciplines, they found that mentoring provided by doctoral advisors had significantly positive and direct impacts on both self-efficacy and interest in a faculty career, which is consistent with previous studies on the

direct effects of proximal contextual influences on undergraduate students' career behaviors and attitudes (e.g., Lent et al., 2003; Restubog et al., 2010). This study demonstrated that the influence of faculty mentoring, performed as an environmental supports, develops doctoral students' beliefs in their abilities to pursue a faculty career and influences their career interest. Consistent with other studies on doctoral students' careers (e.g., Dabney & Tai, 2013; Fuhrmann et al., 2011; Hill, 1997; Luebs et al., 1998), doctoral faculty advisors provide a significant impact on early stage doctoral students' career outcomes, especially as regards shaping doctoral advisees' confidence in their abilities to pursue a certain career path (e.g., a faculty career) and career interests.

On the other hand, Gibbs and Griffin (2013) obtained an in-depth understanding of career interest-formation processes toward or away from a faculty career, through focus group interviews, in an effort to address the complex issue of doctoral students' career choices. Although Gibbs and Griffin (2013) did not initially focus on the role of faculty advisors in students' interest formation, vicarious learning experiences from their advisors were found to be critical to shaping outcome expectations for obtaining a faculty position. Regardless of their degree of interest in faculty careers, the majority of participants perceived that faculty life in academia, especially at research-oriented universities was extremely hard (Gibbs & Griffin, 2013).

Additionally, Gibbs and Griffin (2013) identified that personal value was the primary driver for impacting career decisions to pursue a faculty career (not outcome expectations beliefs about faculty careers). Specifically, participants who formed an interest in pursuing a faculty career acknowledged challenges (e.g., fewer faculty positions available, demanding workload),

but they expressed a continued interest in pursuing such careers because what they considered to be personally and professionally important could be best accomplished through such paths.

Although there are only two studies in this category, they nevertheless provided insights into how doctoral students formed career interests. For example, faculty advising may play a critical contextual role in enhancing doctoral students' beliefs about their capacity to obtain faculty positions. The positive relationship with faculty advisors may develop positive expectations for such careers, but personal values that each doctoral student has in terms of his/her career should be considered. If individuals value freedom to pursue their own interest or ideas when they choose a career, the supports and guidance provided by faculty may increase their interest in faculty careers. Notably, such supports may not significantly shape a strong interest in pursuing faculty careers when students believe that the nature of faculty work would not provide them with enough opportunities to engage in the values they considered important.

Synthesis. This discussion demonstrated that the volume of research on doctoral students' career development for success in obtaining careers in their respective fields after the completion of doctoral education lagged considerably behind research on factors of doctoral program completion and retention, as previous researchers indicated (Neumann & Tan, 2011; Rudd, & Nerad, 2015; Thune, 2009). Moreover, past research regarding doctoral students' career-related experiences tended to focus on academic faculty careers weighted heavily on doctoral students in sciences and engineering with little systematic understanding of the interaction between career development and its existing theories. This misaligned attention by researchers broadens a gap in understanding recent doctoral students' diverse career choices and their growing career needs.

Although recent doctorates' career outcome surveys (e.g., SED, 2013) help to track their employment trends, from initial placement to several years later, it is still unclear why and how

certain populations of doctoral students decide to pursue a certain career path as well as differences between doctoral students who pursue faculty careers and those who pursue non-faculty careers. A recent study conducted by Gibbs and Griffin (2013) provided helpful, theoretically-based insights on how doctoral students formed their career interests. However, this study primarily focused on a faculty career, so participants of the study were not selected based on career choices, but they were chosen based on interest level in a faculty career. Moreover, it was limited with regard to an understanding of career decision-making processes of doctoral students pursuing non-faculty careers. Also, like other existing studies, examining non-faculty career paths in isolation may provide limited insight to comprehend doctoral students' career development processes as a whole.

Furthermore, the majority of studies on doctoral students' careers were conducted without a clear theoretical framework to guide the research. Only two empirical studies (Curtin et al., 2016; Gibbs & Griffin, 2013) in this review were grounded in a theoretical model, SCCT. Lacking a connection to a theoretical understanding of career development is partially related to historical aspects of doctoral students' career research. By developing the theory-building and theory-testing literature in the fields of career development, research on doctoral students' career development may further advance a more comprehensive understanding of doctoral students' career-related experiences, especially with regard to why and how they make a career choice, and what career development assistance they need for their career pursuits.

Synthesis of the Literature

Research built on theoretical frameworks. Considering the lack of theoretical groundings in the current studies on doctoral students' career decision-making, a comprehensive overview of the literature on other populations' career decision making (e.g., college students),

from the perspective of CIP theory or SCCT, provides enriched theoretical and empirical foundations that benefit future directions for research on doctoral students' career decision making.

Although two studies (Curtin et al., 2016; Gibbs & Griffin, 2013) employed SCCT theory to guide their studies and considered the effects of cognitive constructs in their research design, to illuminate the complexity of doctoral students' career choice, the theoretically ill-matched measures or analyses on cognitions have limited explanatory value. For example, one item that Curtin and colleagues (2016) used to measure self-efficacy was insufficient to capture the concept of self-efficacy considering a construct needs to be measured by at least two items (Raubenheimer, 2004). Further, self-efficacy should be measured by asking participants to rate their perceptions of their current abilities to perform specific tasks (Lent & Brown, 2006). However, Curtin et al. (2016) simply used one question for doctoral students to indicate whether they were confident to become a professor, which might be too broad or general to measure their perceived abilities to perform specific tasks relevant to faculty careers. Similarly, Gibbs & Griffin's (2013) study lacked a theoretical concept of self-efficacy by framing participants' general confidence in doctoral education as self-efficacy rather than identifying the confidence in their abilities to conduct the unique behavioral domains related to entering faculty career paths. Thus, careful consideration of research design and instruments to properly reflect the concepts of theoretical constructs are also needed for further research.

To respond the current gap regarding theoretical application, this study employed the CIP theory and SCCT as theoretical foundations. Both theories guided this study to design and select appropriate measurements to reflect theoretical constructs that this study aims to measure. For example, the CASVE cycle of CIP theory provided a foundation to develop interview questions

to explore how an individual makes a career choice. It also used SCCT, which provides available measurements, previously developed and tested, to examine the differences in doctoral students' perceptions of environmental influences and their career beliefs (examined comparatively between the two groups based on their sought careers).

Influence of environmental factors on the career choice process. Although SCCT emphasizes the influences of distal variables (e.g., gender, social status), previous studies provided a mixed presentation of the effect of distal environmental factors on the career choice process. However, a review of this collection of literature consistently indicated the influences of proximal contextual factors (e.g., career barriers, social supports) on people's career decision-making processes, such as career beliefs (e.g., self-efficacy).

These findings suggest the necessity of considering contextual influences when examining the career decision-making process (Lent et al., 2000; Lent et al., 2003) to clarify the complex ways in which contextual and cognitive variables influence the career choice process. Thus, this study examined the proximal contextual influences, including career barriers and supports, to understand how differently doctoral students perceive these influences based on their sought careers. The study controlled for distal contextual influences in order to capture the main effect caused by the different chosen career paths of doctoral students. Specifically, this study examined doctoral students' perceptions of career barriers and environmental supports first through the quantitative approach. Based on the quantitative data findings, this study further explored specific types of barriers or supports that doctoral students perceive during their career decision-making processes by analyzing interview data.

Academic disciplines. Further, the current literature on career decision making, including doctoral students, heavily focused on the sciences and engineering fields (e.g., Byars-

Winston & Fouad, 2008; Fox & Stephan, 2001; Gibbs & Griffin, 2013; Lent et al., 2003), which offered a limited the view of doctoral students' career-related experiences at large. This study included doctoral students across disciplines, representing a broader range of participants to examine the process through which people in various fields make a career choice in an effort to understand the situation generally, prior to focusing on specific fields. This approach provided a more comprehensive foundation to recognize the core or common factors that influence the career decision-making processes of doctoral students.

A lack of qualitative approach in career decision-making process. Lastly, from the review of career development literature, it appears that the majority of empirical studies, grounded in CIP theory or SCCT, are largely quantitative in nature. These quantitative studies contribute to making the existing theories or constructs more solid and by developing and testing standardized measures (e.g., self-efficacy) that can be compared across studies in different contexts. However, such research studies did not provide sufficient insight regarding why or how certain findings are formed. In other words, the information provided by quantitative research often cannot be fully explained without an in-depth understanding of participants' own perspectives. For example, qualitative research may help identify particular types of career barriers and supports that a certain population (e.g., doctoral students) perceives, why they perceive them as barriers or supports, and how they respond to them (Lent et al., 2000).

In order to respond to the shortcomings derived from the current quantitative-intensive literature, this study employed a qualitative approach to promote an in-depth understanding of the process by which people come to make a certain career decision as they progress through a decision-making cycle by using CIP's CASVE cycle as a theoretical foundation. This may be shown from participants' perspectives. Beyond the qualitative approach, this study also

employed the quantitative approach as guided by SCCT, which enabled to connection with previous studies, which were primarily quantitative.

To broaden understanding of career decision-making process of doctoral students while responding to the identified gaps in the literature reviewed, this study integrated CIP theory and SCCT to gain a comprehensive understanding of how doctoral students make a post-graduate career decision and differences between the groups based on their sought careers. This study was conducted to answer the following research questions to respond to the identified gaps:

1. Given the theoretical grounding of SCCT, are there significant differences in ABD doctoral students' expected environmental supports and barriers to pursue their sought careers, belief in their own abilities to make a career decision, and expected career outcomes, based on their sought career paths after adjusting effects of distal contextual variables?

2. What are ABD students' internal cognitive processes, guided by CIP theory's CASVE cycle, for deciding to pursue a faculty or non-faculty career, respectively?

3. In what ways and to what extent do the findings of the quantitative data guided by SCCT and findings of the qualitative data guided by the CIP theory empirically converge and diverge to contribute to a comprehensive and nuanced understanding of the career decision-making processes of ABD doctoral students considering different career paths?

Chapter 3

Methods

This chapter opens with a brief introduction of the research approach for this study. The introduction is followed by a discussion of the research design including the rationale to select a mixed methods approach, research setting, sampling, and instruments used in this study. Then, research procedures employed to collect and analyze data for this research to answer each research question are described.

Mixed Methods Research as a Research Paradigm

Grounded in a pragmatic worldview, mixed methods research employs a combination or integration of quantitative and qualitative research approaches within a single study (Creswell, 2014). Quantitative research generally collects data that are closed-ended responses yielded from survey questionnaires or instruments aimed at obtaining a more generalizable truth, while a qualitative approach often collects open-ended data that are not determined beforehand in an effort to capture multiple truths (Creswell, 2014; Johnson, Onwuegbuzie, & Turner, 2007). Each of these methods resides at different ends on a continuum within a research paradigm (Newman & Benz, 1998). Mixed methods research is now considered the third major research paradigms (Johnson et al., 2007). It represents the middle of this continuum because it embraces both qualitative and quantitative viewpoints (Creswell, 2014; Johnson et al., 2007). The use of multiple research methods and theories are expected to capture a more comprehensive and theoretically-grounded understanding of the dynamics and complexities of the investigated phenomenon than the potential captured by a single research method (Creswell, 2014; Greene, Benjamin, & Goodyear, 2001).

Convergent parallel design is a common mixed method strategy (Creswell, 2014) because it represents the traditional mixed methods purpose, triangulation (Greene, 2007). The good convergence design requires "not just separation but independence of method, one from the other" (Greene, 2007, p. 123). Afterward, they merge the two different data sets to examine convergence and differences for triangulation (Creswell, 2009). Denzin (1978) indicated that the results of triangulation enable researchers to gain a superior understanding of the phenomenon being researched (Johnson et al., 2007). Figure 3.1 presents a visual representation of the research process of convergent parallel mixed methods design.

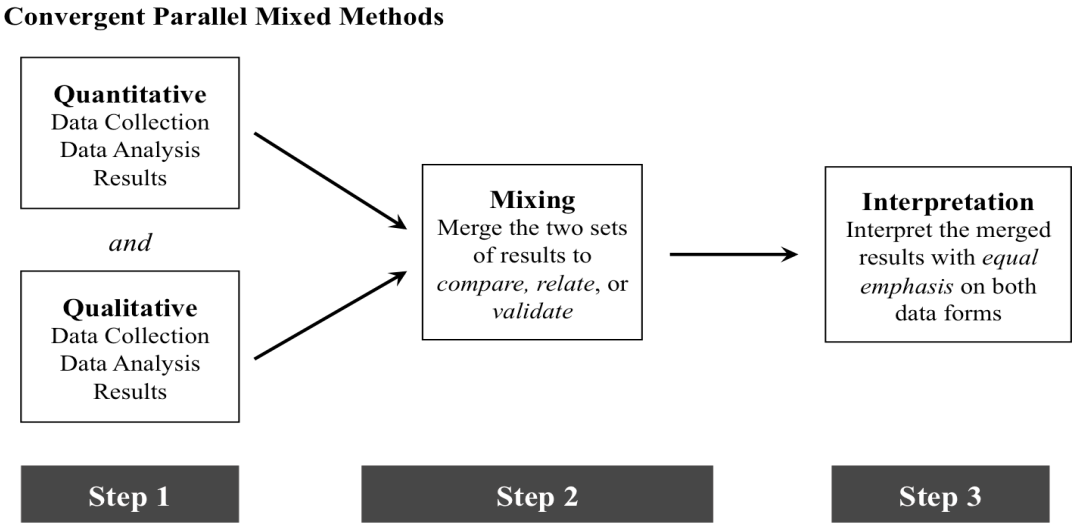

Figure 3.1. Convergent parallel mixed methods design (built upon the figure provided from Creswell, 2014, 2015)

Rationale for choosing mixed methods research.

Considering decades of career development research efforts to elaborate the ways in which a career decision is made, the lack of theoretical connections to previous career development research severely limited the advancement in understanding doctoral students' career choices. Aiming to diminish the research gaps identified in the current literature on

doctoral students' career development, this study employed a mixed methods approach to examine doctoral students' internal career decision-making processes while also investigating the differences in doctoral students' perceptions of contextual barriers and supports as well as career beliefs based on their sought careers.

Using a mixed methods approach to collect and analyze data provided this study with several benefits. First, it allowed this study to build on previous studies, which were primarily quantitative. The previous research served as theoretical and empirical foundations for this study by using previously-developed and tested survey instruments (*quantitative data*) to shed light on how doctoral students differently perceived environmental influences and their career beliefs based on their sought career paths during their career decision-making process. Second, this method approach enabled this study to deeply understand the career decision-making process step by step from participants' perspective via interviews (*qualitative data*). It might enhance the currently insufficient understanding of what doctoral students actually experience when making their post-graduate career choices (Wendler et al., 2012). Lastly, interacting data from the different methods (qualitative and quantitative) and theories enabled this study to identify overlapping and different facets of doctoral students' career decision-making process (*triangulation*), which helped to extend the range and breadth of understanding of doctoral students' career decision-making process (*expansion*).

Research Design

Research setting. This exploratory study was conducted at a large, public, and research-oriented university in the Midwestern U.S., referred to as a United States Midwest University (USMU). USMU is a research-oriented public university with approximately 100 doctoral programs in a variety of disciplines. As a large doctorate-granted institution, USMU strongly

emphasizes research excellence. For example, USMU received over 450 million dollars in external funds for research during one semester in 2015. Demographically, USMU is a predominantly white institution (more than 65% of doctoral students self-identified as white among a domestic doctoral student population), but it is known for its number of earned doctorates from underrepresented minorities. In addition, a large body of international doctoral students from over 10 countries (more than 45% of doctoral students self-identified as international) pursued doctorates at USMU in 2015-2016. In 2015-2016, 59% of the doctoral student population was male and 41% was female.

A single institutional research site was selected for several reasons, as described below. First, U.S. higher education institutions vary in terms of their educational missions, learning environments, students served, selectivity, academic disciplines offered, and types of degrees awarded (National Center for Education Statistics, 2015). Thus, selecting a single institution as a research site allowed this study to account for the unique institutional environment that is created by a single institution. Data collected from multiple institutions may, in fact, provide limited insights on environmental influences because it cannot control for the effects of different institutional environments across universities. Thus, a single institutional research pool allowed this study to deeply and more consistently explore doctoral students' interactions with proximal environmental aspects during their doctoral program.

Furthermore, examining USMU alone increased the possibility for embracing diverse aspects that might influence the career decision-making process because USMU provides a broad scope of academic disciplines offered (e.g., sciences, engineering, agriculture, humanities, and behaviors and social sciences) with a diverse doctoral student population. Lastly, this study required the setting of a boundary to make concurrent multiple data collection and analysis

feasible. Thus, the potential insights that this study might gain from a single institution and a multiple methods approach were expected to exceed the advantages that a multi-institutional research with a single method approach could obtain. Although the insights gained from this study might not be directly related or generalized to doctoral students who pursue doctorates in other higher educational institutions in the United States and other countries, the insights offered are expected to stimulate other lines of inquiry on doctoral students' career development.

Target population and sample size. A purposive sampling strategy was adopted to include only the people of interest that suit the purpose of the study. ABD doctoral students who have passed their preliminary exam in doctoral programs at USMU were invited for this study. Participants of this study included all doctoral students in the ABD stage, regardless of affiliated disciplines, except for a professional doctoral program, such as veterinary medicine due to their relatively clearer career path than other doctoral disciplines. At USMU, there were 91 doctoral programs, excluding professional doctoral degree programs. Based on the categories provided by the National Science Foundation's (2014) science and engineering indicator, USMU provided 41 science and engineering related doctoral degrees and 50 humanities and social science related doctoral degrees.

With a support from USMU's information management division, a total of 1,200 ABD doctoral students at USMU (*a target population*) were invited to participate in the study. Although these 1,200 ABD doctoral students received the email invitation to participate in the study, their participation was completely voluntary. Individuals who were recruited for interview participants were from individuals have participated in the quantitative research. Mixed methods researchers often recruit qualitative research participants within the larger quantitative research participants because "the more they are similar, the better the comparison" (p.222) between the

two data (Creswell, 2014). Therefore, this study embraced a semi-parallel approach by recruiting interview participants who completed the survey only as an effort to collect data from the similar cohort.

Regarding quantitative research, a minimum effective sample size in this study would be 52 participants in order to run statistical analyses, analysis of covariance (ANCOVA) with six covariates (with a large effect size (f=0.4) and a good statistical power at alpha = .05). The following research procedure to respond to the research question 1 (RQ1) provides more information of types of covariates and the criteria used to select six covariates. Thus, this study aimed to collect at least 100 participants for the surveys in case of incomplete responses from some of participants. ABD doctoral students who completed the online surveys were recruited across disciplines and categorized into faculty career path (n=15) and non-faculty career path (n=15) groups. More information is provided in the data collection section.

Once the data collection was complete, demographic characteristics of participants of this study were compared with those of the target population to ensure the representativeness of the sample. USMU's institutional research office provided aggregated demographic data of the target population of this study.

Human subjects review and voluntary consent. This study received human subject research approval from USMU's institutional review board (IRB, see Appendix A). This effort was made to ensure that research steps taken by this study were appropriate to protect participants' rights and welfare once they agree to participate in this study.

Prior to responding to survey questions or interview questions, participants were provided with information through a voluntary consent form to build a common understanding of this study, such as purpose of the study, data collection procedure, and strategies to maintain

confidentiality of participants when analyzing data and reporting findings (see Appendix C for consent letters). Based on this understanding, prospective participants decided whether or not to participate in this study. During the interview, participants obtained a copy of the voluntary consent form so that they could use this document as a reference to contact the researcher to address any questions that may arise after their interview participation. In addition, interview participants were also provided an opportunity to ask any questions during the data collection.

Throughout this research, confidentiality and anonymity were maintained once individuals agreed to participate in this study. Unique identifiers were created to mask participants' names, which were only used to identify connections between interviews and survey data if needed. As for survey participants, identifying information was not be connected with participant responses in order to maintain confidentiality. As for interviews, participant names were not used, and instead, codes (e.g., IP123) and pseudonyms were used to protect participants' identity and privacy. To give extra attention to this population, the researcher reviewed transcriptions first to identify any information that might reveal participants' privacy. If so, identifiable information was removed or changed to protect their privacy prior to conducting data analysis.

Instrumentation. This section describes the survey instruments that were used in the study to collect quantitative data and the interview procedures to collect qualitative data.

Survey instruments. This study employed five survey instruments. These included the following: (1) Career Decision Self-Efficacy-Short Form Scale (CDSE-SF Scale) (Betz & Taylor, 2001), (2) Vocational Outcome Expectations (VOE Scale) (McWhirter et al., 2000); (3) Contextual Barriers and Supports (CBS Scale) (Lent et al., 2001); (4) Rapport subscale from the Advisory Working Alliance-Inventory (AWAI) (Schlosser & Gelso, 2001) and (5) demographic

questionnaire, including questions regarding participants' post-gradated career choices. These instruments were pilot-tested during a specific time period (June- August 2016) with a sample of doctoral students who spent at least two years of their doctoral programs at USMU. Based on the results of the pilot study, this set of survey instruments were modified as needed prior to conducting them for the full study.

Career Decision Self-Efficacy Scale – Short Form (CDSE-SF). The CDSE-SF assesses "an individual's degree of belief that he or she can successfully complete the tasks necessary to making career decisions" (Betz et al., 1996, p. 48). Among a variety of process domain self-efficacy, career decision-making self-efficacy received the most interest from researchers in career development literature (Betz & Luzzo, 1996; Choi et al., 2012). The most commonly used instrument to assess career decision making is the CDSE-SF (Betz & Taylor, 2001), which provides insights for how an individual perceives his or her personal abilities regarding the process of making academic and career choices. The CDSE-SF was employed in previous studies to measure participants' confidence in making career or academic decisions (e.g., Huang & Hsieh, 2011; Quimby & O'Brien, 2004; Restubog et al., 2010; Thompson & Subich, 2006; Wright et al., 2014).

The CDSE-SF consists of five subscales. These include the following: (1) accurate self-appraisal, (2) gathering occupational information, (3) goal selection, (4) making plans for the future, and (5) problem solving. Participants were asked to what extent they are confident to accomplish each of the provided career decision-making tasks. Participants are presented with a 5-point scale ranging from 1 (no confidence at all) to 5 (complete confidence). To address the growing needs for a shorter version in career development fields, the CDSE-SF was created

(Betz & Luzzo, 1996). The original CDSE scale contains 50 items, but Betz et al. (1996) developed a 25-item short form by removing five items from each of the five subscales.

Betz et al., (1996) reported that internal reliability scores ranged from .73 to .83 for each subscale and yielded an alpha of .94 for the 25-item total score. According to Betz, Hammond, and Multon (2005), internal reliability scores of the 5 sub-scales ranged from .78 to .87, as well as alphas for the full 25-item instrument, ranging from .94 to .95 from the three samples. In terms of construct validity, the CDSE-SF was found to be a key factor associated with various career-related behaviors, such as career indecision (Betz & Luzzo, 1996; Taylor & Betz, 1983), adaptive career beliefs (Luzzo & Day, 1999), career adjustment (Betz & Luzzo, 1996), and vocational identity (Betz et al., 1996). The CDSE-SF was also positively related to psychological constructs, such as an internal locus of control (Taylor & Popma, 1990).

Moreover, the CDSE-SF scale was also found as a valid and reliable instrument in assessing career decision-making self-efficacy of international students studying in the U.S. From their pre- and post-test research, Bikos and Furry (1999) reported high degrees of internal consistency ranging from .94 at pre-test to .82 at post-test. Recently, Liu (2009) used CDSE-SF scale with 190 international graduate students studying in the U.S. and found the high level of internal consistency at .94.

Considering the purpose of this study, the items that pertain to tasks related to choosing a major were changed to choosing a career/job. For example, an item, "select one *major* from a list of potential *majors* you are considering" is modified as "select one *job/career* from a list of potential *jobs/careers* you are considering." In this way, the CDSE-SF primarily measured participants' perceived abilities in making career choices.

Vocational Outcome Expectations (VOE). The VOE (McWhirter et al., 2000) consists of six items that assesses the degree of individual beliefs about the outcomes of various courses of action, regarding a selected career choice. The coefficient of reliability of VOE scale was reported as .83 (McWhirter et al., 2000) to .85 (Kenny, Blustein, Chaves, Grossman, & Gallagher, 2003). A five-point Likert scale is provided for all items with response options ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate stronger career outcome expectations. CDSE and VOE theoretically and empirically examined significant influence on individual's choice, actions, persistence, and performance (Bandura, 1997; Betz & Taylor, 2006; Choi et al., 2012; Lent et al., 1994; Lent et al., 2003).

The VOE scale was used to examine the levels of vocational outcome expectations of diverse racial backgrounds (e.g., Kenny et al., 2003; McWhirter et al., 2000). Recently, Ma and Yeh (2010) used the Chinese version of the VOE scale with 265 recent Chinese immigrants and reported the alpha coefficient as .81.

Contextual Barriers and Supports (CBS). The CBS was created by Lent et al. (2001) to assess the degree with which participants perceive the likelihood of experiencing barriers and supports. Using a 5-point Likert scale from 1 (not at all likely) to 5 (extremely likely) allows participants to indicate how likely they would be to experience each of the 15 supports (e.g., "have access to a 'mentor' who could offer you advice and encouragement") and 21 barriers (e.g., "receive unfair treatment because of your gender") if they pursue their chosen career path. The CBS barriers consist of four subscales. These include the following: (1) social or family influences, (2) financial constraints, (3) instructional barriers, and (4) gender and race discrimination. The supports consist of four subscales including (1) social support and encouragement; (2) instrumental assistance; (3) access to role models or mentors, and (4)

financial resources. Lent et al. (2001) reported that the barriers and supports measures yielded adequate internal consistency reliability estimates, .90 and .88 respectively. In addition, coefficient alpha values reported by Lent et al. (2003) for the barrier and supports scales were, respectively, .94. and .92.

The CBS was originally developed to measure college students' math/science related barriers and supports. Thus, this study slightly modified the CBS to assess participants' perceived environmental barriers and supports relative to pursuit of their chosen career choice. For example, an item, “receive negative comments or discouragement about your major from family members” was modified as "receive negative comments or discouragement about your sought post-graduate career from family members." Three items regarding instructional barriers (e.g., “have professors or teaching assistants who are difficult to understand”) were excluded because they are irrelevant to the purpose of this study. In this way, the CBS could primarily assesse participants' perceived barriers and supports in pursing their post-graduate career choice. Therefore, a total of 18 items for barriers and 15 items for supports were used for this study.

Considering the importance of a supportive relationship between a doctoral student and her or his advisor on the doctoral student’ academic and professional development (Barnes & Austin, 2008; Gelso & Lent, 2000; Morrison & Lent, 2014; Schlosser & Gelso, 2001), one subscale of the AWAI-S scale was added in this study as another environmental support component to capture the unique situation of doctoral students. Originally, the AWAI-S scale measures an advisee’s perceptions of the working alliance with his or her advisor. This study only selected *Rapport* subscale (11 items) because this subscale was found the most critical factor among the AWAI scale in creating a positive working alliance between an advisor and a doctoral student (Schlosser & Gelso, 2001). Rapport suggests a critical part of the advising

relationship reflecting the faculty advisor's encouragement and supports of the doctoral advisee (Schlosser & Gelso, 2001). The empirical study (Schlosser & Gelso, 2001) also demonstrated that the rapport subscale had the highest positive correlation with advisee's self-efficacy (rapport, $r = .36$; apprenticeship, $r = .29$; identification, $r = .20$; $ps < .001$). Higher scores indicate that the advisee is more likely to feel encouraged and respected and supported by his or her advisor (Schlosser & Gelso, 2001), which can be conceptualized as environmental supports for doctoral students. Their test-retest internal consistency reliability coefficients of Rapport subscale across a 2-week interval were reported .93 and .89 respectively by Schlosser and Gelso (2001). In addition, the coefficient alpha value reported by a recent study conducted by Huber, Sauer, Mrdjenovich, and Gugiu (2010) with 109 doctoral students was .89.

Moreover, recent empirical studies conducted by Rice and colleagues (2009) and Rice, Suh, Yang, Choe, and Davis (2016) demonstrated that the Rapport subscale can be used to assess international graduate students' perceived levels of rapport with their faculty advisors. Both Rice et al. (2009) and Rice et al. (2016) reported the coefficient of reliability of Rapport subscale as .93.

Demographic questionnaire. A demographic questionnaire was created for this study in order to collect information on participants' background characteristics, including age, gender, ethnicity, marriage/civil partnership status, citizenship (domestic and international students'), academic discipline, and standing year in the program. In addition, questions related to participants' post-graduate career choices and when they passed their preliminary exam(s) (e.g. May 2015) were included. Information collected from the demographic questionnaire was used for the following purposes: (1) to describe the sample; (2) to ensure that the sample represented the target population provided by the information management division; (3) to categorize the

participants into groups for purposes of comparison (e.g., faculty career path and non-faculty path groups); and (4) to provide covariates for ANCOVA analysis. Specifically, age, gender, ethnicity, marriage/civil partnership status, citizenship, and academic discipline are used for covariates for ANCOVA. More information regarding covariates can be found in the following description of research procedures related to address the first research question.

Interview protocol. One-on-one, open-ended structured interviews were conducted. Interview questions were developed based on the CASVE cycle to explore participants' career decision-making processes step-by-step in a theoretically-sound manner (see Appendix F). In addition to the six phases (Communication, Analysis, Synthesis, Valuing, Execution, and Communication2) of the original CASVE cycle, an *Introduction* was created as an effort to examine how participants describe their decision-making process without any guiding questions. This ultimately helped to understand what aspects of the decision-making cycle that participants highlighted when reflecting on their decision-making process. These were modified based on thorough reviews by a doctoral-level expert in qualitative research and another doctoral-level expert in CIP theory. Interview data collected from the core interview questions helped capture each step of career decision-making process to understand how participants made sense of their overall experiences when making post-graduate career choices.

In addition to the interview questions, the researcher asked various probing questions (e.g., “could you provide me a specific example?”) to each participant to elaborate on their responses and to provide specific examples, which helped to obtain a deeper understanding of the different facets of the phenomenon of interest (Alam, 2005). The abovementioned efforts were made to gain “rich data filled with words that reveal the respondents’ perspectives” (Bogdan & Biklen, 2007, p. 104).

Research Procedures

This section describes how the data were collected and analyzed in chronological order. Then, the section explains the procedures for the pilot study and full study. The research procedures for the full study are discussed based on the order of research questions. After data collection, information about actual data collected from the study, such as participants of this study (e.g., demographics), and response rates, are provided in Chapter 4 for quantitative study and Chapter 5 for qualitative study.

Overview. This study was implemented in two phases. First, a pilot study was conducted. During the pilot study, survey and interview data were collected from participants who resemble the target participants. The full study design was modified based on findings of the pilot study. Figure 3.2 provides the timeline of research activities to complete the study. The following sub-sections provided data collection procedures for each study (pilot and full studies).

Stage	Research Phase	Phase A & B			Phase C			Phase D		Phase E			Phase F		
	2016-2017 Timeline (Semester/ Month)	Spring 2016			Summer 2016			Fall 2016					Spring 2017		
		3	4	5	6	7	8	9	10	11	12	1	2	3	4
Preparation Stage	**Phase A.** Preparing dissertation for Prelim														
	1) Developing literature review section														
	2) Developing method section														
	3) Submit IRB Form and receive an approval														
	Phase B. Taking Prelim Exam														
	1) Present a proposal to dissertation committee														
	2) Submit IRB amendment														
Research & Analysis Stage	**Phase C.** Conduct Pilot Test														
	1) Pilot-testing all survey instruments														
	2) Pilot-testing interviews														
	3) Modify survey/ interview questions														
	Phase D. Collect Data														
	1) Conduct online surveys														
	2) Conduct interviews														
	Phase E. Conduct Data analysis														
	1) Individually analyze interview & survey data														
	2) Integrate two sets of findings to examine the ways that they converge and diverge for a complete understanding														
Completion Stage	**Phase F.** Disseminate Findings of the Study														
	1) Defend the dissertation														
	2) Modified the dissertation														

Figure 3.2. One-year timeline for this study

Pilot study. A pilot study was conducted to prepare for a full study to accomplish the following two purposes: 1) to verify that designed survey and interview instruments or ideas would work in practice (Jariath, Hogerney, & Parsons, 2000) and 2) to obtain an opportunity for the researcher to make necessary revisions prior to conducting the full study (Kim, d2010).

The pilot study was conducted between June and July 2016. Participants of this pilot study were doctoral students who were close to the targeting population of this study. Thus, this study recruited doctoral students who remained enrolled in doctoral programs for at least two years. Pilot study participants who participated in the survey were invited to participate in the interviews in order to obtain the two strands of data collected from similar participants (Creswell, 2014). Recruited participants for the pilot test were 20 doctoral students for surveys and eight participants for one-on-one interviews.

The pilot survey was conducted to ensure whether the wording of survey questions was easy to understand and to measure how long it took to complete the instruments. The survey participants were recruited through email invitations (see Appendix B). The email clearly indicated that participation was voluntary and participants could skip questions they do not wish to answer. Prior to conducting the surveys, they received the consent letter (see Appendix C). A total of 20 doctoral students completed the pilot survey.

The pilot study surveys were divided into two different forms: paper and online surveys. First, the majority of participants for the pilot survey (n=15) were invited to participate in the paper survey to collect in-depth feedback from participants while completing the surveys. Paper surveys were conducted at a secure location within campus based on the preference of participations. During the paper surveys, the researcher stayed in the same room where participants were completing the surveys, but she kept a distance with participants so that they

could respond to the survey questions without feeling monitored. Whenever they had any questions, they let the researcher know. After addressing their questions, researcher recorded the unclear questions or wording for later revision. At the end of the paper surveys, the researcher asked all participants a follow-up question to check if they experienced any difficulties understanding survey questions.

During the paper survey, the researcher paid special attention to international doctoral students to investigate whether they experienced any difficulty answering the survey questions during the pilot paper surveys. Considering that the survey instruments used in this study were based on the U.S. context and that international graduate students are more likely to experience language barriers (Rice et al., 2009), it was important to examine whether there was any existing English proficiency issue among international students and whether they experienced any difficulty interpreting the context of survey questions. After the paper surveys, an additional five participants were recruited to participate in online surveys to explore whether the online survey system functioned properly as designed. Survey Monkey software was used to create online surveys for the full study.

In addition, reliability analysis was conducted to determine if the items on each scale used in the study are reliable. The result of reliability analysis ensured each scale that this study used for the full study was internally consistent. If a certain scale provided a relatively lower reliability compared to previous studies, the researcher carefully evaluated whether or not delete an item of the scale that contributed substantial decrease in the scale by using the "Alpha if Item Deleted" function in SPSS. If deleted, the reliability analysis was conducted again to ensure increased reliability level.

As for the pilot interview, all survey participants were invited to participate in one-on-one pilot interviews while answering the survey questions. In order to recruit participants of interviews, the two questions were added to pilot surveys to ask whether they were interested in participating in the interviews. If they expressed their interest in participating in interviews when answering the first question, they were asked to provide their preferred contact information such as email or phone number. Participants who agreed to participate in interviews received another email invitation within two days (see Appendix B). The email invitation included an interview guideline for participants (see Appendix D) so that they could anticipate what questions they would receive during the interviews. Interviews were conducted at a secure location within campus based on the preference of participations. After obtaining the permission of the participants, the interviews were audiotaped and transcribed only for analysis purposes.

All interview participants were told that they could ask questions if they could not understand the meaning of interview questions during the interviews. The researcher recorded the unclear questions or wording for revision purposes. After the interviews, one of the interview participants was invited to review the interview questions. The focus of the interview data analysis was to examine whether interview structure and questions could obtain relevant responses from participants regarding their career decision-making processes. Findings of the pilot study were used 1) to demonstrate the feasibility and quality of survey and interview instruments and 2) to refine the fully study design. The results of the pilot study and interviews as well as how the pilot study informed the full study are discussed in Chapter 4 and Chapter 5 respectively.

Full study. After a description of strategies to invite participants of the study, the procedures of full study from data collection to data analysis are discussed based on each

research question. As proposed in Chapter 1, quantitative survey data answered the first research question (RQ1) while the second research question (RQ2) was addressed by conducting qualitative interviews. After analyzing separately the collected survey data (RQ1) and interview data (RQ2) and, the two data sets were interacted for triangulation to obtain a valid and comprehensive understanding of participating doctoral students' experiences regarding the career decision-making processes (RQ3).

Strategies to recruit participants. Participants were invited through collaboration with a campus unit, given permission from the Office of the Dean of Students and the information management division at United States Midwest University (USMU). USMU has a campus-wide system to assist select and provide prospective participants who are currently affiliated with USMU based on the criteria provided by the researcher. After approval from the Associate Dean of Students was obtained on August 10, 2016, the information management division built the email invitation system containing the target population for the researcher. The information management division randomly selected 1,200 ABD doctoral students based on the demographic characteristics of the whole ABD population at USMU to ensure the representativeness of the sample. By using this system, the researcher was allowed to send email invitations with a survey link to the targeting population (see Appendix B for a recruitment letter). The system was ready on September 9, 2016. The initial participant recruitment began September 13, 2016. After seven days, follow-up e-mails were sent out to encourage non-respondents' survey participation. The data collection of the full study was conducted between September 2016 and October 2016. More information is provided in the following subsections of research procedures.

Categorizing faculty and non-faculty career groups. Information collected from the demographic questionnaire were used to categorize participants into the two groups (faculty

career path and non-faculty path groups) for comparison. In an effort to categorize them into two groups, this study asked participants to choose their *current primary* post-graduate career choices rather than asking their post-graduate career choices in general. If there are participants who have not decided their career paths (those who select "have not decided yet" choice) in the study, their responses were excluded to achieve the purpose of the study.

Research Question 1 (RQ1): Differences in perceived contextual influences and career beliefs between the groups. To respond to the first research question, this study recruited participants for online surveys in order to collect quantitative data. Collected data was analyzed by using the one-way ANCOVA. See the full research question below.

- Given the theoretical grounding of SCCT, are there significant differences in ABD doctoral students' belief in their own abilities to make a career decision, and expected career outcomes, and perceived environmental supports and barriers to pursue their sought careers based on their sought career paths after adjusting effects of distal contextual variables?
    - Are there differences in career decision-making self-efficacy based on their sought career paths (faculty career and non-faculty career) after adjusting effects of distal contextual variables?
    - Are there differences in expected career outcomes based on their sought career paths (faculty career and non-faculty career) after adjusting effects of distal contextual variables?
    - Are there differences in perceived environmental barriers and supports based on their sought career paths (faculty career and non-faculty career) after adjusting effects of distal contextual variables?

RQ 1: Data collection procedure. With a support of the information management division in USMU, 1,200 randomly selected ABD doctoral students were invited via email, which were sent by USMU's campus-wide system. The link in the email led to the consent letter before participating in the survey (see Appendix C). The same software used for the pilot study was used to create a consent letter and survey questions. All participants were asked to complete the surveys. The survey consisted of five components, as follows: (1) the CDSE scale; (2) the

VOE scale; (3) the CBS scale; (4) Rapport scale; and (5) a demographic section. Once participants completed all of the survey questionnaires, survey participants who fully completed the survey received $10 gift cards. Those who completed the online surveys were also invited to participate in the interviews.

Age, gender, ethnicity, marriage/civil partnership status, citizenship, and academic discipline are considered to be the six covariates for this study. These elements of distal contextual variables, especially ethnicity and gender, were hypothesized to influence an individual's perceptions of proximal contextual variables (e.g., barriers) and other socio-cognitive variables (e.g., self-efficacy) by SCCT (Lent et al., 1994). Gender (e.g., Smith, 2001), and marriage/civil partnership status including the effect of childcare, and age (e.g., Quimby & O'Brien, 2004) were empirically demonstrated their effects on self-efficacy and perceptions of contextual influences.

Moreover, citizenship was selected based on the complicated employment regulations for international students (Lin & Flores, 2011). These regulations were viewed as one of the critical factors that could affect international students' career planning, especially during the transition from school to work (Sangganjanavanich, Lenz, & Cavazos, 2011). Lastly, the study conducted by Curtin et al. (2016) reported that ethnicity and fields of disciplines demonstrated significant influences on self-efficacy and career interest in a faculty career path. Thus, these variables were controlled to identify differences caused by the differences in doctoral students' sought career paths.

RQ 1: Data analysis. To answer the first research question of this study, the statistical software SPSS 24.0 was used to perform several statistical analyses on the collected quantitative data. The analysis was conducted after collecting quantitative data.

Prior to conducting the main analyses, the data collected were checked for data entry and accuracy, outliers, and missing data. After preliminary analyses were complete, the main analyses were conducted. Specifically, descriptive statistics were conducted to obtain a profile of the sample of this study. The analyzed demographic characteristics of the participants of this study were compared with those of the target population to ensure the representativeness of the sample by using aggregated demographic data of the target population obtained from USMU's information management division. Moreover, as discussed earlier the sample was divided into a faculty career path group and a non-faculty career path group based on their responses to the question asking their primary career paths after graduation in an effort to describe the basic characteristics of each group.

Reliability analysis was conducted on survey data to determine if the items on each scale used in the study are reliable. Although reliability issues were addressed based on the findings from the pilot test, the researcher carefully evaluated whether or not to delete an item of the scale that contributed to a substantial decrease in the scale by using the "Alpha if Item Deleted" function in SPSS if a certain scale provided a relatively lower reliability compared with the previous studies that used the same scale. If deleted, the reliability analysis would be conducted again to ensure its increased reliability level.

Next, group differences were examined. Specifically, data were divided into two groups based on participants' post-graduate career paths. By using the analysis of covariance (ANCOVA), this study examined differences in expected environmental supports and barriers, their beliefs in abilities to make a career decision, and expected career outcomes between doctoral students' sought career paths (faculty route versus non-faculty route) after adjusting covariates. ANCOVA is an extension of ANOVA, combining regression analysis. It is usually

employed to compare the performances of two or more groups on a given variable. This procedure is accomplished by statistically controlling the effect of certain variables (covariates) that may be correlated to dependent variables, which are not major concerns, or independent variables of the study (Leech et al., 2005; Martin & Bridgmon, 2012; Pedhazur, 1982).

The aim was to primarily examine differences solely based on chosen career paths after controlling the effects of covariates. By using ANCOVA, six demographic variables, including gender, ethnicity, marriage/civil partnership status, age, citizenship, and academic discipline were selected as covariates. To control for the effects of covariates in ANCOVA, these variables should be measured at a continuous level. To transform the categorical covariates among the six covariates (except for age) into continuous variables, they were converted into dummy variables. The ANCOVA model assumes linear relationships between covariates. Also, it assumes such relationships between covariates and the dependent variables, reliability of covariates, and homogeneity regression slopes. This is in addition to the usual assumptions of ANOVA: normality and homogeneity of variance. According to ANCOVA, the purpose of measuring the reliability of covariates is to check whether covariates are reliable. However, the assumption may be justified in cases of demographic variables, such as sex and age, since these variables are usually measured with fair reliably (Pallant, 2010). Thus, all assumptions of the ANCOVA except for reliability of covariates were tested in this study to verify the data are appropriate for the further analyses prior to running the one-way ANCOVA. Figure 3.3 provides a quantitative research model visualizing the one-way ANCOVA.

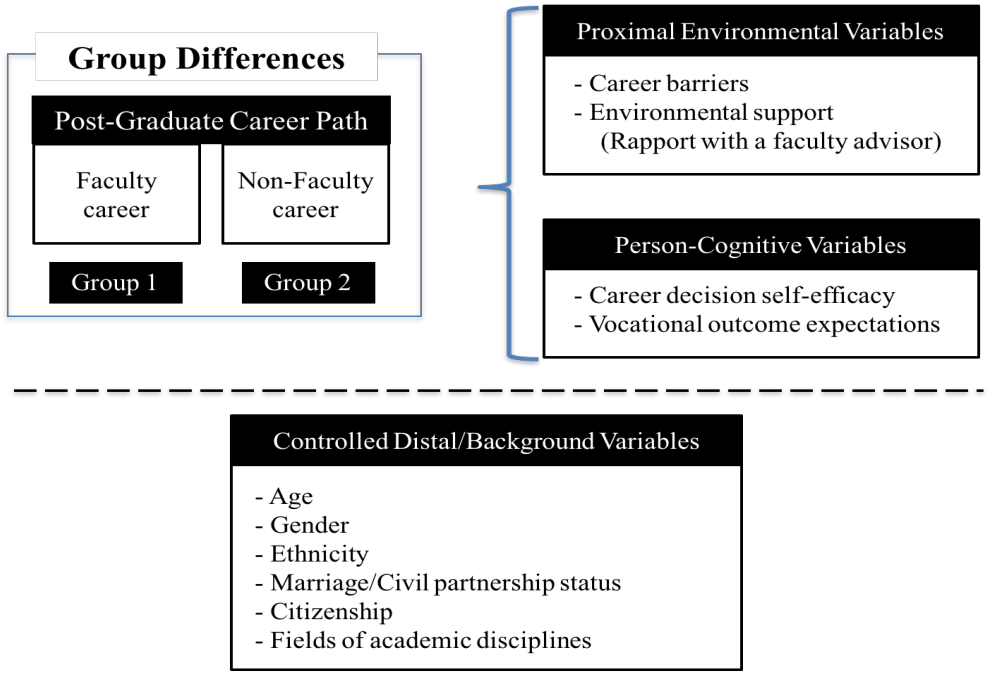

Figure 3.3. Research model for ANCOVA

To sum up, the quantitative data were analyzed to respond to the first research question of this study by conducting following statistical analyses methods:

1) Data screening and diagnostics including data entry and accuracy check, and missing data were conducted prior to the main analyses
2) Descriptive statistics was performed to obtain a profile of the sample and delineate the distribution of scores for the study variables
3) Cronbach's alpha technique was used to estimate reliability
4) All categorical covariates variables (e.g., gender, ethnicity) were transformed to dummy variables in order to make them continuous covariate variables
5) Correlation analysis was conducted to examine the associations between variables, especially between covariates to verify whether if there is multicollinearity between the covariates.
6) Assumptions of the ANCOVA were assessed in the following manner:
    a. Examined whether there was a linear relationship between covariates and between the covariates and the dependent variables for each group to determine the six variables assumed to be covariates are supported

b. Examined if there was no significant interaction existing between the covariate and the group by identifying this study has homogeneity regression slopes
c. Examined if the dependent variables were approximately normally distributed for each group of independent variable
d. Examined if all groups of independent variables had homogeneity of variance
e. Examined if there were outliers in dependent variables

7) ANCOVA was conducted to test to examine differences in perceived environmental supports and barriers, their beliefs in abilities to make a career decision, and expected career outcomes between doctoral students' sought career paths after removal of the effects of the six covariates

Research Question 2 (RQ2): Internal career decision-making process. To respond to the following second research question of this study, this study recruited participants for one-on-one, structured interviews to collect qualitative data. The collected data were analyzed by using directed content analysis.

- What are ABD students' internal cognitive processes, guided by CIP theory's CASVE cycle, for deciding to pursue a faculty or non-faculty career, respectively?
    - What similarities and differences are identified based on their sought career paths?
    - What are the factors that influence post-graduate career decision-making process to pursue faculty or non-faculty careers, respectively?

RQ 2: Data collect procedure. Similar to the pilot study, the full study employed a purpose sampling to recruit only those ABD doctoral students who suit the purpose of the study. As emphasized earlier, only individuals who completed the online survey were invited to participate in the one-on-one interview by inviting survey participants at the end of the online survey. The researcher sent email invitations to survey respondents who expressed their interest in participating in the interviews through the contact information provided by the participants

(see Appendix B). An interview guideline was attached for them to anticipate what questions would be asked during the interviews.

ABD doctoral students were recruited across disciplines and categorized into faculty career path (n=15) and non-faculty career path (n=15) groups. Interview participant recruitment discontinued when the total number of interview participants reached 30. The interviews were conducted between September 2016 and November 2016.

The researcher kept a reflective journal during the interviews data collection as part of the qualitative research process. The reflective journal included, but is not limited to aspects of the interview process, the researcher's perceived interactions with a participant, topics covered during the interview, and the reactions of the researcher. Reflections made as a result of engaging in reflective journaling provided the researcher with opportunities to explore the researcher's own biases and perceptions and portray them so that the researcher was able to reduce the impact of her own biases when interacting with participants and analyzing data (Lincoln & Guba, 1985). The researcher began to keep the reflective journal from the pilot study to the full study.

RQ 2: Data analysis. Once two interviews (audio recording) were transcribed, data analysis began by uploading the interviews onto the NVIVO 11.0 software package. This software assisted with the coding and analysis of data from qualitative and mixed method research.

As soon as the interview transcripts were prepared, the transcripts were shared with the interview participants (only their own transcript) via email to provide the participants with the opportunities to assess accuracy of the data and to reflect on whether the transcript represents their own experiences, which in turn enabled them to examine if there was any difference

between the participant's own impression of the conversation during the interview and its representation in the transcript (Forbat & Henderson, 2005; Gibbs, 2007). By receiving the confirmation from participants, the researcher ensured that the transcript was faithful copy of what participants said during the interview (Gibbs, 2007). This was complete voluntarily. Participants' feedback served as a foundation for member checking (Lincoln & Guba, 1985; Savin-Baden & Major, 2012). Member checking enables interview participants to ensure "adequate representations of their own (and multiple) realities" (Lincoln & Guba, 1985, p.314) The accurate descriptions confirms the credibility.

A directed content analysis (DCA) (Hsieh & Shannon, 2005) was applied for data analysis, which deductively analyzed the data based on pre-identified coding categories that were established from the theory. This content analysis approach provided a relatively more structured process than conventional content analysis, which is analyzed through an open-coding approach (Hsieh & Shannon, 2005). DCA uses a guiding theory that enables researchers to develop initial coding categories that are developed based on the theory used. The researcher deductively comprehends the data based on pre-determined coding categories (Hsieh & Shannon, 2005). The CIP's CASVE decision-making cycle provided the initial coding categories in this study to make sense of the collected data, and it helped to identify emerging primary themes as they evolved throughout the interviews.

In order to increase the validity and reliability of the data analysis, the researcher invited another co-researcher to analyze the data together. The co-researcher was a doctoral student in Higher Education program in College of Education. She had worked for USMU's career office for three semesters, which helped her better understand students' career-related experiences as well as familiarized with her career theories such as SCCT. Moreover, she served as a member of

USMU's graduate student advisory board to enhance the academic, professional, and social experience of graduate students at USMU. She worked as a research assistant and was experienced in analyzing qualitative data. Based on her relevant experiences and educational background, the researcher selected her as a co-researcher to conduct qualitative analysis. The two coders interacted once a week from September 2016 to January 2017 for both the data analysis and peer debriefing sessions to discuss inquires during the data analysis as well as help each other fully recognize one's attitudes and postures toward the inquiries.

To be effective, codes should capture meaningful units of analysis. To facilitate this process, and before coders begin data analysis, it was critical to segment texts (Hruschka, Schwartz, John, Picone-decaro, Jenkins, & Carey, 2004). Unit of analysis might be individual words, phrases, sentences, paragraphs, or entire interviews. There is no standardized rule to decide the unit of analysis (Krippendorff, 1995). The process involved two coders reading the two transcripts together to discuss how to segment the text (the unit of analysis) before analyzing the interview data. Coders agreed to focus on a "meaning unit," which might range from one sentence to a paragraph. For example, one participant described one's interest in a sentence, in response to a question about interest, but another participant explained one's interest in a paragraph by including a specific example. Despite differences in length, both answers indicated the interest of each participant (the meaning unit). Consequently, each answer was coded as one unit of analysis.

After reaching consensus about the units of analysis, the two researchers (the leading researcher of the study and one associate) coded parts of the randomly selected interview data together. To acquire sufficient transcripts to be randomly selected, the data analysis began once more than five interviews transcripts became available. As guided by DCA coding procedure

(Hsieh & Shannon, 2005), the researcher highlighted all passages considered to represent any phase of the CASVE career decision-making cycle (e.g., the communication phase). Since the interview questions were developed based on each phase of the CASVE cycle, these questions served as guides to categorize each transcript into each phase.

Using NVivo, all highlighted texts (quotes) were moved to each relevant phase. Subsequently, the coders independently coded the data in each phase based on the key constructs of each CASVE cycle phase. They used the pre-determined coding categories' selected theory. For example, the data categorized into the communication phase were analyzed based on the key constructs of the CASVE cycle's communication phase (e.g., internal cues, external cues, current status, desired career status, meta-cognition). When texts could not be coded as existing key constructs of the CASVE cycle's communication phase, the raters examined whether the texts might be coded into one of the other phases of the CASVE cycle. Finally, texts remained that could not be coded into any of the five phases of the CASVE cycle. Consequently, these were moved to the "others" category and reexamined, which led to the creation of new codes based on raters' consensus.

According to Hruschka et al. (2004), variation in understanding code definitions, which were provided in the coding guide between the raters, may impact the level of inter-rater reliability between the two raters. To reduce variation between the raters, the researchers independently analyzed two interview transcripts based on the pre-developed coding guide. During the analysis, they discussed how and why each rater coded each unit of analysis in a certain manner. Also, they examined whether any modification was required in the given code definitions to make more sense of the data. Throughout these two coding rounds, modifications

were made to the coding guide, and both raters reached consensus for all code definitions in the modified coding guide (See Appendix G).

Based on the updated coding guide, during a third-coding round, the two coders independently coded the randomly-selected transcript, without any discussion, to examine the inter-reliability between the two coders. After the independent coding process, a Kappa statistic (Cohen, 1960) was used to measure the inter-rater reliability between the two raters. Figure 3.4 provides the overall process to build inter-rater reliability during the interview data analysis.

Considering that the Kappa of .81 is in the "almost perfect" agreement range between our two observers (Viera & Garrett, 2005), raters convened to develop consensuses among the codes in the case of low inter-rater reliability (< .80). Considering the unit of analysis in this study, the Kappa of each phase was calculated based on paragraph. If inter-rater reliability was lower than .80, the two coders discussed to clarify the discrepancy between them during the analysis process. Based on the discussion, they modified problematic codes if needed. Then the raters re-conducted the analysis by using the modified coding guide and the coding process was repeated until the inter-rater reliability reaches .81. When the inter-rater reliabilities of the first data analysis in all CASVE cycle phases and the introduction reached over 0.81, the raters interpedently coded the remaining data. When completing the all coding, the two raters reviewed the coded data before merging them after completing all coding.

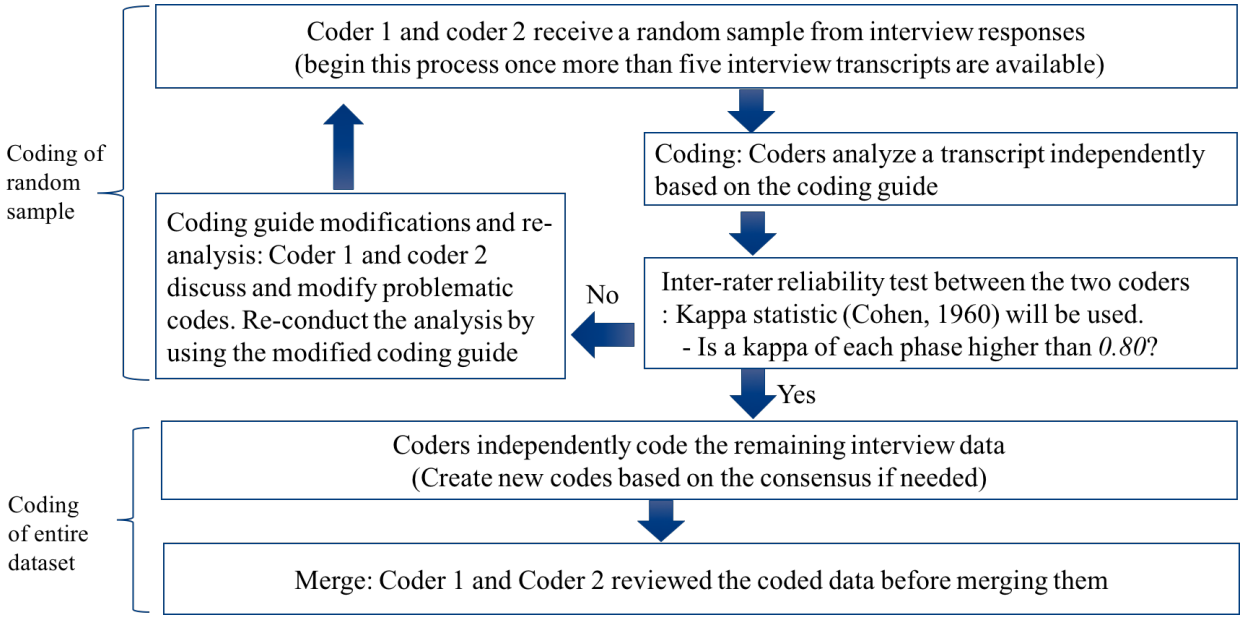

Figure 3.4. Process for building inter-rater reliability (Adapted from Hruschika, Schwartz, John, Picone-decaro, Jenkins, & Carey, 2004, Field Methods, 16, p. 311)

When the coding analysis was complete, the leading researcher identified patterns and differences in the data of each phase of the CASVE cycle. Primary themes in each phase by each group were initially extracted. To capture emerging patterns of the data in each phase, the frequency of codes in each phase of the CASVE cycle was also calculated. Code counting serves a useful purpose for qualitative research, and it is particularly relevant when researchers make judgments about importance or qualities. Phrases—"number of times," "more often," and "consistency"—signal judgments derived from counting. The practice of counting codes enables researchers to recognize the substance of a large amount of data, promoting analytical honesty and ethics. Lastly, it helps researchers to verify a hypothesis, especially when conducting mixed methods research (Miles, Huberman, & Saldaña, 2014). The calculated frequency of codes in each phase was displayed in a graph to show patterns of code distributions across the key constructs of each phase of the CASVE cycle, including the introduction that was specifically

designed for this study. This graph helped to recognize major constructs where participants' reflections were concentrated within each phase of the CASVE cycle based on the frequency of codes. For instance, the graph of the communication phase presents the code distributions across the core constructs of this phase. This includes internal cues, external cues, current status, desired career status, meta-cognition, and other sections. Other key constructs for other phases (e.g., analysis phase), which were identified in the communication phase, are also examined. In addition, an independent sample *t*-test was used to identify and examine any significant differences at to where participants linger in their reflections between the two groups during the career choice processes based on the calculated code frequency.

Further, the findings of DCA were reviewed to extract exemplars that were aligned with constructs of the guiding theory (Hsieh & Shannon, 2005). The researcher extracted primary themes in each phase during the career decision-making process and validated CIP's CASVE cycle interactions. In order to extract themes, the researcher created summary interview notes to identify emerging themes in each phase (See Appendix G). From the notes, themes emerged only from at least three participants of each group were selected to further examination. After careful examination, these themes were merged and reduced to a final theme list for each phase. The final themes were presented with exemplars, which were aligned with constructs of the guiding theory. This process applied to both the faculty career group and the non-faculty career group, identifying similarities and differences in post-graduate career decision-making processes based on sought career paths.

A peer review session was conducted at the completion of the data analysis in March 2017. The proposed findings were shared with an expert on career development. The expert was particularly knowledgeable with SCCT and CIP theory. This sharing process aimed to confirm

that the findings seemed reasonable to the expert, based on data and experience as a career counselor. During this session, background information on the study, including research questions and how interpretations were made from the data, were analyzed. The expert was encouraged to discuss which findings were expected or which were unexpected or surprising. This session offered an opportunity for the expert to ask questions and to share her own interpretations of the data based on her experience. The discussion from the peer review session informed interpretations and conclusions of the study. Finally, a qualitative research expert, who was not involved in the study, conducted an external audit to assess the trustworthiness of the study by examining the process to answer the inquiry (Savin-Baden & Major, 2013).

Research Question 3 (RQ3): Merging the data for triangulation. After the two strands of data (surveys and interviews) were separately analyzed, the data were compared in a joint matrix to gain a more complete understanding of the career decision-making process of doctoral students. Another aim was to obtain a defensible conclusion as a result of triangulation on the phenomenon being researched (Creswell, 2014; Greene, 2007) by answering the following research question:

- In what ways and to what extent do the findings of the quantitative data guided by SCCT and findings of the qualitative data guided by the CIP theory empirically converge and diverge to contribute to a comprehensive and nuanced understanding of the career decision-making processes of ABD doctoral students considering different career paths?
    - In what ways and to what extent do environmental barriers and supports, career-decision self-efficacy and career outcome expectations derived from SCCT relate to each phase of the CASVE cycle??
        - What similarities and differences are identified based on their sought career paths?
    - In what ways and to what extent do the identified patterns of environmental barriers and supports as well as self-efficacy and outcome expectations within the CASVE cycle explain the findings of the quantitative data guided by SCCT in this study?

First, the qualitative data categorized into each CASVE cycle from the previous qualitative research were re-examined by using a joint matrix developed with four SCCT constructs, used in the quantitative research, as a thematic analysis coding guide (see Appendix G). The concept of a matrix that is organized by ordered dimensions allows for qualitative data to "assess possible relationship[s] not otherwise pursued" (Greene, 2007, p.154). An example of a matrix for data display is shown in Table 3.1.

Table 3.1

Example of Joint Display Arraying Categories by Themes

Dimension: Quantitative Themes: SCCT core constructs examined

Dimension: Qualitative Responses (CASVE cycle)

Qualitative Categories CASVE cycle		**Quantitative Themes (SCCT Core Constructs)**				
Participant ID	**Phase of CASVE cycle**	**Career Barriers**	**Environmental Supports**	**Self-efficacy**	**Outcome Expectations**	**Other**
Participant - 1 (P-1)	Communication-1 (C-1)	Quotes, descriptions (*type of barriers if you find*)	Quotes, descriptions (*type of supports if you find*)	Quotes, descriptions (*types of self-efficacy if you find*)	Quotes, descriptions (*types of outcome expectations if you find*)	Quotes, descriptions (*Theme that does not belong to existing categories if you find*)
P1	C-2					
P2…	C-1…					
P1	A-1					
P1..	A-2..					
P1	S-1					
P2	S-1…					
P1	V-1					
P1	V-2…					
P1	E-1					
P2	E-1					

The same coding procedure used to answer the second research question (RQ2) was applied in this section to address the third research question, especially for the first sub-question. After the consensual definitions of coding guide of SCCT were developed, coder 1 and coder 2 independently coded the transcripts to measure inter-rater reliability. After examining the inter-rater reliability between the two raters (Kappa >.081), DCA was conducted to code emerging SCCT themes from each CASVE cycle and put them into the joint matrix. The matrix (see Table 3.1) provided clear directions for data analysis, and the findings of the analysis were used to identify how SCCT constructs influenced each phase of the career decision-making process (*complementary)*. Specifically, two contextual barriers and supports were framed as external factors on the career decision-making process that are implicit in the CASVE cycle. Also, the two socio-cognitive variables were viewed as career beliefs that are similar to the concept of metacognitions in CIP theory (Bullock-Yowell et al., 2012). The re-investigation of the qualitative CASVE cycle helped to identify environmental barriers and supports, as well as socio-cognitive variables, which were relatively implicit, but critical in the CASVE decision-making cycle.

Primary themes in each phase and by each group were initially extracted. To capture emerging patterns of the data in each phase, the frequency of codes was calculated to examine the patterns of how each SCCT construct related to each phase of the CASVE cycle. The calculated frequency of codes was displayed in the joint matrix to demonstrate patterns of SCCT thematic code distributions across the CASVE cycle including the introduction that was specifically designed for this study. This process applied for both the faculty career group and the non-faculty career group, in an effort to identify similarities and differences in post-graduate career decision-making processes based on sought career paths. Similar to the research process

used for analyzing the previous qualitative data to answer the second research questions (RQ2), an independent sample t-test was used to examine whether there were any significant differences of SCCT code destructions between the two groups as they evolved within the primary themes. The similar thematic analysis process used to answer the second research question was applied. The summary interview notes were created and themes emerged from at least three participants of each group were selected to further examination. After careful examination, these themes were merged and reduced to a final theme list for each phase.

The peer review session was also conducted at the completion of the qualitative data analysis based on SCCT in March 2017 with the same expert on career development in order to confirm that the findings seemed reasonable based on the data and her experience. The process of the peer review session was conducted in a similar manner as the previous session conducted for RQ2. The external audit was also conducted.

Lastly, the findings were used to enable the researcher to answer the third research question (RQ3), especially for the sub-second questions by comparing the findings of the quantitative data and identifying overlap and different facets between the two sets of findings. This comparison confirmed (or did not confirm) the significant findings of surveys: whether significant factors from quantitative analysis are consistently identified from the CASVE cycle (*triangulation*). This effort expanded insights to better understand the results of survey analysis. This process served as a merging strategy for both data collection results. Ultimately, this data triangulation provided a more complete picture of doctoral students' post-graduate career decision-making processes based on CIP theory and SCCT. This comprehensive approach aimed to capture varying dimensions of the same phenomenon observed by different approaches (Greene, 2007), and it helped achieve greater confidence in the conclusions made from the study.

Chapter 4

Results of Quantitative Study

This chapter presents the results of the quantitative study in the following two primary sections. First, this chapter begins with findings as a result of quantitative pilot study and the improvement made to the full study. Then, the second section presents the results of quantitative data analysis.

Results of Quantitative Pilot Study Data Analysis

To ensure the feasibility and quality of survey instruments, a pilot study was conducted. The pilot study involved two data collection methods: quantitative data (surveys), and qualitative data (interviews). Pilot study data collection consisted of administering surveys to 20 students. In this section, findings of the pilot survey and the revisions made for the full study are discussed.

There were two modes of data collection: the paper and online surveys. Among a total of 20 participants, 15 of them completed the paper surveys, and the remaining five completed the online surveys. The online survey system functioned properly as designed. This sub-section begins with the demographic distribution of the sample. It is followed by the time that participants spent completing the surveys, and the feedback received from the participants for improvements of the full survey. Lastly, a reliability analysis was conducted to determine if the items on each scale used in the study are reliable.

Demographics information. A total of 20 participants provided their demographic information, including gender, age, affiliated college, year of program, citizenship, ethnicity, as and primary career choice (Table 4.1). Over half of the participants (n=11, 55%) reported an intention to pursue non-faculty career paths, and five participants (25%) chose faculty career paths as their primary career choice. All participants reported that they had not passed

preliminary exams yet. Half of the participants were either third year (n=6, 30%) or fourth year (n=5, 25%) students. The majority of the participants were from the College of Education (n=13, 65%), which was followed by the College of Engineering (n=3, 15%).

Among 20 respondents, 10 of them (50%) were domestic students, and the remaining participants (n=10, 50%) were international students. Only five (20%) reported to have children (two for two children, one for four children, and one for four children). Nearly half of the participants (n=8, 40%) were between 25 and 30 years old. Lastly, the majority of the participants identified themselves as Asians (n=13, 65%), which was followed by White (n=6, 30%), and Black/African America (n=1, 5%).

Table 4.1.

Participant Demographics of the Pilot Study

Variables	Values	Frequency	Percentage
Primary Career Choice	Faculty career path	5	25.0%
	Non-Faculty career path	11	55.0%
	Haven't decided yet (Not sure)	4	20.0%
Year of Program	1st year	1	5.0%
	2nd year	4	20.0%
	3rd year	6	30.0%
	4th year	5	25.0%
	5th year	3	15.0%
	6th year	1	5.0%
Preliminary Exam	No	20	100%
	Yes	0	0.0%
Affiliated College	Education	13	65.0%
	Engineering	3	15.0%

	Applied Health Sciences (AHS)	1	5.0%
	Graduate College	1	5.0%
	Liberal Arts and Sciences (LAS)	1	5.0%
	School of Social Work	1	5.0%
Citizenship	Domestic	10	50.0%
	International	10	50.0%
Marriage/civil	Single	15	75.0%
Partnership Status	Married or domestic partnership	5	25.0%
Children	Yes	4	20.0%
	No	16	80.0%
Age Range	Under 24	1	5.0%
	25-30	8	40.0%
	31-35	6	30.0%
	36-40	2	10.0%
	41-45	1	5.0%
	Over 45	2	10.0%
Gender	Male / Man	8	40.0%
	Female / Woman	12	60.0%
Ethnic Identity	Asian	13	65.0%
	Black or African American	1	5.0%
	White	6	30.0%
Total		20	100%

Time participants spent completing the surveys. During the paper surveys, the researcher kept track of the time that it took to read and complete the questionnaire by using a timer. When participants asked questions, the researcher stopped the timer until the questions were addressed. As for online surveys, the online survey system was equipped with a timer to keep track of the time spent completing each survey. The average time was 12 minutes 26 seconds. The longest was 17 minutes, and the shortest was nine minutes.

Feedback and modifications made to full study survey. Frist, none of international students reported to experience either any difficulty answering the survey questions or any difficulty interpreting the context of survey questions during the pilot paper surveys due to English proficiency or cultural issues. Among 20, five participants offered suggestions for improvements to the format of the questionnaire, grammar issues, and the scale instructions. The other participants (n=15) mentioned that the questions were clear and easy to answer.

Regarding the survey question relating to primary career, – What is your current primary career choice after graduation? – three of the participants asked whether they could choose more than one and mentioned that it would be easier to understand if there were a clear instruction, such as "choose only one answer." Thus, the researcher incorporated participants' feedback, modifying the questions by adding the requested instruction. In addition, two respondents reported that the instructions of the CBS scale were confusing. They were not sure if the instructions asked them to indicate their perceptions of career barriers and supports after they achieve their career choices or during the process of pursuing their sought careers. In order to make it clearer, the instructions were modified based on participants' feedback. Table 4.2 provides the summary of the implications for the full study survey.

Reliability test. Cronbach's alpha scores were used to measure the internal consistency of a scale (Cortina, 1993; Nunnally, 1978). A value of 0.7 is commonly considered an acceptable limit for social science research (Crotina, 1993). In this pilot survey, all of Cronbach's alpha scores were greater than the satisfactory level (0.7). Table 4.3 indicates the number of items and reliability for each scale.

Table 4.2

Participant Feedback and the Improvement Made to Full Study Survey

Area Received Feedback	Before Feedback	After Feedback
A question regarding a primary career choice	What is your current primary career choice after graduation?	What is your current primary career choice after graduation (select only one)?
Instruction of CBS scale	Before answering next questions, think career choice that you consider after graduation. Please read carefully and indicate how likely you would be to experience each of the following situations if you pursue your sought career.	Before answering next questions, think of a post-graduate career choice that you consider. Please read carefully and indicate how likely you would be to experience each of the following situations during the process of pursuing your sought career.

Table 4.3

Internal Consistency Reliabilities of the Scales

Scale		Number of items	Cronbach's α
CDSE-SF	Total Score	25	.94
	Self-Appraisal	5	.79
	Occupational Information	5	.86
	Goal Selection	5	.77
	Planning	5	.84
	Problem Solving	5	.78
VOE		6	.79
CBS	Career Barriers	18	.87
	Career Supports	15	.90
Rapport		11	.92

Results of Full Quantitative Study Data Analysis

After the feasibility and quality of survey and interview instruments were achieved, the full study was conducted. The full study involved two data collection methods: quantitative data (surveys), and qualitative data (interviews). Full study data collection consisted of administering surveys to 372 ABD students and conducting one-to-one interviews with 30 students. This section presents the quantitative data analysis (survey) only. The results of the qualitative data analysis (structured-interviews) will be discussed in Chapter 5.

The collected quantitative data were analyzed to answer the following first research question, "given the theoretical grounding of SCCT, are there significant differences in ABD doctoral students' belief in their own abilities to make a career decision, and expected career outcomes, and perceived environmental supports and barriers to pursue their sought careers based on their sought career paths after adjusting effects of distal contextual variables?"

After measuring an overall response rate, the sub-section begins with preliminary analyses, including accuracy of data entry and missing data procedures that were performed prior to conducting descriptive statistics. The demographic characteristics of participants of this study were compared with those of the target population to ensure the representativeness of the sample. It was followed by correlation and reliability analyses to verify reliability and correlations to examine multicollinearity among the covariates prior to conducting ANCOVA.

Response rate. In this study, 1,200 ABD students at USMU were initially contacted for participation in the survey. Among them, 372 students participated in the online surveys. The initial overall response rate of 31% was achieved. However, the survey collected 313 usable responses after eliminating incomplete responses (n=16) and responses that did not meet the criteria of this study, including respondents who did not pass the preliminary exams (n=14),

respondents who haven't decided career choices yet (n=25), respondents who were supposed to be excluded such as students in Medicine (n=2), and respondents whose choices couldn't not be categorized into either faculty or non-faculty track such as post-doctoral position (n=2). The effective response rate is 26%.

Data screening and diagnostics. The first data analysis procedure was to conduct preliminary analyses to verify the quality of gathered data prior to conducting the main analyses. The collected data in this study were examined for the accuracy of data entry, missing data patterns, and dealing with missing data.

Accuracy of data entry. The initial data entry was conducted by Survey Monkey. All responses were stored in password-protected online storage and transformed into an Excel file. The file was then imported into SPSS software for data analysis. If the original data collected were transformed incorrectly into the data file, the results of data analyses would be distorted. Hair, Black, Babin, and Anderson (2009) suggested proofreading the original data against the transformed spreadsheet to check for data accuracy. In this study, there were no significant errors discovered during the data transformation.

Missing data analysis. Using incomplete data, without analyzing missing data, may cause several problems for moving forward with statistic procedures. Consequently, this poses threats to statistical inferences (Allison, 2009; Dong & Peng, 2013). First, missing data can reduce statistical power and enhance standard errors because there is less information available than initially planned (Peng, Harwell, Liou, & Ehman, 2006). Moreover, missing data might generate potential bias in estimating parameters and decrease the generalizability of the result of the statistical analyses (Rubin 1987; Schafer 1997). Lastly, the presumption of most statistical methods and software is based on complete data (Allison, 2009; Schafer & Graham 2002). Thus,

missing data analysis should be conducted prior to any further statistical procedures (Dong & Peng, 2013).

Missing data analysis consisted of the following two steps. First, the patterns of missing data were analyzed to determine whether the missing data were distributed randomly. Based on the diagnosis of the patterns, an appropriate imputation method to handle missing data was selected.

The total missing data (including both categorical and quantitative data) are 43 out of 26,605 (2%). Among 313 participants, 34 participants missed at least one question (11%), ranging up to 6 questions. Specifically, 30 participants (88%) out of 34 missed one question. Although any imputation methods can be used if the missing data are under 5% of the total data, (Hair et al., 2009), the missing data pattern was examined. Little's chi-square statistic for testing whether values are *missing completely at random* (MCAR), or are ignorable, was conducted to confirm that one variable that was missing did not depend on any other variables (Allison, 2009). From the MCAR missing data test, a nonsignificant statistical level (p value is greater than 0.05) indicates that the observed pattern is a complete random pattern (Allison, 2009; Hair et al., 2009). The MCAR test obtained for this study's missing data resulted in a chi-square = 1906.08 (df = 1916, $p < 560$), indicating that the missing data were randomly distrusted. In other words, there was no potential bias existing in the pattern of missing data in this study (Hair et al., 2009).

When missing data are characterized as MCAR, any imputation methods may be applied to the missing data (Hair et al., 2009; Tabachnick & Fidell, 2013) because they are ignorable for sample-based inferences. In short, almost any method for addressing the missing values produces similar results, if the data are MCAR (Tabachnick & Fidell, 2013). Further, this study applied an Expectation-Maximization (EM) method to account for missing quantitative (continuous) values.

EM is a numerical algorithm based on the likelihood function (Dong & Peng, 2013). If the pattern of missing data is MCAR, its mechanism is ignorable for likelihood-based inferences (Holman & Glas, 2005). Thus, under this condition, EM is an unbiased and reasonable approach to impute missing data (Dong & Peng, 2013; Tabachnick & Fidell, 2013).

Moreover, the "prefer not to respond" selection was grouped with missing responses in this study. This occurred prior to transforming all categorical covariate-variables to dummy variables to conduct ANCOVA. Responses such as "prefer not to respond" and "don't know" are usually considered as non-response items by most researchers (e.g., Jones et al., 2016) even though these are not exactly the same type of missing data (Albaum, Wiley, Roster, & Smith, 2011). Thus, a total of missing categorical values in this study were 17 including the "prefer not to respond" responses and a total of 13 cases. This categorical missing data were not imputed. Although the missing categorical data could be transformed to dummy variables (continuous variables) and imputed, that approach is likely to produce biased results, even if the data are MCAR (Allison, 2009). Therefore, this study applied a list-wise deletion method to account for categorical missing data. According to this method, cases were removed from the analysis when there was any missing value.

Demographics information. The number of participants for this study was 313. Table 4.3 presents the self-reported demographic characteristics of participants with aggregated demographic information of the target population, which was provided by USMU's information management division. The information management division provided only aggregate demographic characteristics of gender, affiliated college, ethnicity, citizenship, and academic disciplines regarding the target population of this study. Subsequently, these five characteristics

were used to compare demographic characteristics of the participants to ensure the representativeness of this study sample.

Overall, the demographic distributions of the participants of the study—regarding gender, affiliated college, ethnicity, citizenship, and academic disciplines—were sufficiently representative of the target population (Table 4.4). Specifically, a majority of this study's participants were from the College of Liberal Arts and Sciences (n=172, 54.9%) and the College of Engineering (n=78, 24.9%). Similarly, the majority of the target population was from the College of Liberal Arts and Sciences (n= 633, 52.8%) and the College of Engineering (n=327, 27.3%). However, there was a discrepancy between two groups in terms of the number of doctoral candidates from the Graduate College. There were four from the Graduate College based on the data from the target population. However, 31 participants self-reported the Graduate College as their affiliated colleges. Additional analysis of these 31 participants' majors indicated that their majors were various: such as mathematics, computer science, biochemistry, and English. Considering various services provided by the Graduate College to doctoral students, participants might believe that the Graduate College was their home college. However, it was clear that their affiliated colleges were not the Graduate College based the reported majors. Thus, their affiliated colleges were re-categorized by using the major names provided by the 31 survey participants. Among the 31 participants, the College of Liberal Arts and Sciences was home college for 29 of them and the rest of them were affiliated with the College of Engineering.

In this study, participants in the field of Science and Engineering (n= 212, 67.7%) outnumbered participants in the Social Science and Humanities field (n= 101, 32.3%). This ratio was almost equal to those of the target population (66.7% for Science and Engineering and 33.3% for Social Science and Humanities fields). Similar patterns were also observed from the

distributions of gender and citizenship between two groups. As for gender, 165 respondents of the participants of this study self-reported as males (52.7%), 145 of them as females (46.3%). These figures were similar to those of the target population (57.3% for males and 42.7% for females). More than half of both participant groups of the study (n=194, 62.0%) and target population (n=690, 57.50%) indicated their status as domestic students. Among the 117 participants with international student status, most students (n=107) indicated their current visa status as F-1, while only nine as J-1 (one is unknown). Such specific visa status information was not available for the target population. Lastly, a majority of participants in this study identified as White (n=156, 49.8%), Asian (n=113, 36.1%), and Hispanic of Latino (n=16, 5.1%). Although the distribution of ethnicity in the target population revealed similar patterns, this finding requires caution with regard to ethnic representativeness of the sample, due to an additional option from the target population (international).

Moreover, over half of the participants (n=171, 54.6%) reported to pursue faculty career paths while 142 participants (45.4%) chose to pursue non-faculty career paths as their primary career choice. The majority of the participants were between 4th and 6th year of their doctoral programs. Over half the participants reported as single (n=190, 60.7%), followed by participants with married or domestic partnership (n=118, 37.7%). Forty-three participants reported to have children (26 for one child, 14 for two children and three for three children).

Table 4.4

Participant Demographics of the Study-Compared with the Target Population

Variables	Values	Participants of the Study		Target Population	
		Frequency	Percentage	Frequency	Percentage
Primary Career Choice	Faculty career path	171	54.6%	-	-
	Non-Faculty career path	142	45.4%	-	-
Year of Program	3rd year	15	4.8%	-	-
	4th year	82	26.2%	-	-
	5th year	97	31.0%	-	-
	6th year	75	24.0%	-	-
	7th year or more	43	13.7%	-	-
	Missing	1	0.3%	-	-
Affiliated College	Liberal Arts and Sciences (LAS)	172	54.9%	633	52.8%
	Engineering	78	24.9%	327	27.3%
	Fine & Applied Arts (FAA)	19	6.1%	69	5.8%
	Agriculture, Consumer, & Env Sciences	14	4.5%	51	4.3%
	Education	11	3.5%	54	4.5%
	Applied Health Sciences	7	2.2%	27	2.3%
	Business	4	1.3%	5	0.4%
	Media	3	1.0%	10	0.8%

Table 4.4 (cont.)

Affiliated College (cont.)	School of Social Work	3	1.0%	2	0.2%
	Library & Info Sciences	2	0.6%	13	1.1%
	Graduate College	-	-	4	0.3%
Academic Discipline	Science and Engineering	212	67.7%	801	66.7%
	Social Science and Humanities	101	32.3%	399	33.3%
Citizenship	Domestic	194	62.0%	690	57.5%
	International	117	37.4%	510	42.5%
	Missing	2	0.6%		
Marriage/civil Partnership Status	Single	190	60.7%	-	-
	Married or domestic partnership	118	37.7%	-	-
	Prefer not to respond	5	1.6%	-	-
Children	Yes	43	13.7%	-	-
	No	270	86.3%	-	-
Age Range	Under 24	6	1.9%	-	-
	25-30	223	71.2%	-	-
	31-35	60	19.2%	-	-
	36-40	14	4.5%	-	-
	41-45	6	1.9%	-	-
	Over 45	2	0.6%	-	-

Table 4.4 (cont.)

Age Range (cont.)	Prefer not to respond	1	0.3%	-	-
	Missing	1	0.3%		
Gender	Male / Man	165	52.7%	688	57.3%
	Female / Woman	145	46.3%	512	42.7%
	Prefer not to respond	3	1.0%	-	-
Ethnic Identity	International	-	-	510	42.5%
	White	156	49.8%	489	40.8%
	Asian	113	36.1%	78	6.5%
	Hispanic or Latino	16	5.1%	57	4.8%
	Black or African American	12	3.8%	29	2.4%
	Multi-Race	6	1.9%	26	2.2%
	AIAN [a]	1	0.3%	4	0.3%
	NHOPI [b]	1	0.3%	1	0.1%
	Other	3	1.0%	-	-
	Prefer not to respond/Unknown	5	1.6%	6	0.5%
Total		313	100%	1,200	100%

Note.

[a] AIAN= American Indian or Alaska Native, [b] NHOPI= Native Hawaiian or Other Pacific Islander

Reliability tests. For the full study, all of Cronbach's alpha scores are greater than the satisfactory level (0.7) and show reliability relative to internal consistency. Table 4.5 presents the number of items and the reliability for each scale.

Table 4.5

Full Study: Internal Consistency Reliabilities of the Scales

Scale		Number of items	Cronbach's α
CDSE-SF	Total Score	25	.94
	Self-Appraisal	5	.80
	Occupational Information	5	.71
	Goal Selection	5	.80
	Planning	5	.80
	Problem Solving	5	.83
VOE		6	.86
CBS	Career Barriers	18	.87
	Career Supports	15	.91
Rapport		11	.93

Categorical variable adjustment. As Table 4.4 demonstrated, there were unequal sample sizes for the variables of age and ethnicity. Such unequal sample sizes can be problematic to conduct ANCOVA because of a potential increase in type I error rates (Johnson, 1993). In other words, unbalanced sample sizes might skew the reliability of tests. Consequently, sub-groups of these two variables were adjusted to reduce the difference in sample sizes to conduct ANCOVA (Table 4.6).

Table 4.6

Sub-group Adjustment of Categorical Variables (Age and Ethnic Identity)

Variables	Before Adjustment		After Adjustment	
	Values	Frequency	Values	Frequency
Age	Under 24	6	Under 30	229
	25-30	223	31 - 40	74
	31-35	60	Over 41	8
	36-40	14	Missing	2
	41-45	6		
	Over 45	1		
	Prefer not to respond	1		
	Missing	1		
Ethnic Identity	White	156	White	156
	Asian	113	Non-White	152
	Hispanic or Latino	16	Missing	5
	Black or African American	12		
	Multi-Race	6		
	AIAN [a]	1		
	NHOPI [b]	1		
	Other	3		
	Prefer not to respond	5		

Note. [a] AIAN= American Indian or Alaska Native, [b] NHOPI= Native Hawaiian or Other Pacific Islander

Descriptive statistics. Descriptive statistics are reported for career decision-making self-efficacy (CDSE), vocational outcome exceptions (VOE), career barriers and supports (CBS), and rapport. Each of the dimensions was scored on a Likert scale, ranging from 0 to 5. Table 4.7 presents the means and standard deviations for CDSE, VOE, CBS, and rapport by groups.

Correlation analysis. When there are multiple covariates, it is important to verify that they are not highly correlated with one another because ANCOVA is sensitive to multicollinearity among covariates. Also, correlation may reduce statistical power since unnecessary covariates are included in the model (Tabachnick & Fidell, 2013). Indeed, if a correlation coefficient between two variables is more than 0.8, it may cause multicollinearity problems (Katz, 2011). Regarding ANCOVA, covariates should be substantially correlated with the dependent variable but not with each other (Pallant, 2010). As evidenced in Table 4.8, inter-construct correlations between covariates ranged from 0.01 to 0.53. Thus, the covariates in this study were verified so that there was no issue with multicollinearity.

Table 4.7

Descriptive Statistics by Groups

			CDSE		VOE		CBS-Support		CBS-Barriers		Rapport	
Group		*N*	*Mean*	*S.D.*	*Mean*	*S.D.*	*Mean*	*S.D.*	*Mean*	*S.D.*	*Mean*	*S.D.*
Career	Faculty	171	3.58	0.58	3.96	0.58	3.81	0.67	2.23	0.58	4.31	0.62
Choice	Non-faculty	142	3.56	0.51	3.93	0.59	3.64	0.71	2.23	0.62	4.08	0.78
Gender	Female	145	3.56	0.57	3.96	0.59	3.71	0.69	2.36	0.58	4.24	0.73
	Male	165	3.60	0.53	3.94	0.57	3.77	0.68	2.12	0.6	4.17	0.69
Marital	Single	190	3.60	0.55	4.00	0.58	3.81	0.67	2.21	0.62	4.18	0.68
Status	Married /DP [a]	118	3.54	0.53	3.87	0.58	3.64	0.71	2.27	0.58	4.26	0.69
Ethnicity	White	156	3.59	0.56	3.99	0.59	3.77	0.7	2.14	0.55	4.17	0.7
	Non-White	152	3.57	0.54	3.92	0.55	3.70	0.68	2.32	0.64	4.24	0.72
Citizenship	Domestic	194	3.62	0.57	3.98	0.62	3.71	0.75	2.16	0.59	4.23	0.72
	International	117	3.50	0.51	3.88	0.52	3.77	0.58	2.35	0.6	4.16	0.68
Academic	S&E [b]	212	3.59	0.56	3.98	0.62	3.71	0.75	2.16	0.59	4.23	0.72
Discipline	SS&H [b]	101	3.54	0.53	3.88	0.52	3.77	0.58	2.35	0.6	4.16	0.68
Age	Under 30	229	3.59	0.55	3.96	0.57	3.79	0.64	2.19	0.59	4.25	0.61
	31 - 40	74	3.52	0.53	3.89	0.56	3.63	0.75	2.37	0.6	4.10	0.9
	Over 41	8	3.84	0.58	4.02	0.88	3.27	1.21	2.26	0.67	3.87	1.15
Total		313	3.57	0.55	3.94	0.59	3.73	0.69	2.23	0.60	4.20	0.71

Note. [a] DP= domestic partnership [b] S&E=sciences and engineering, SS&H= social sciences and humanities

Table 4.8

Inter-correlation Matrix

	Mean	S.D.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Age	1.29	0.51	1.00										
2. Ethnicity	0.51 [a]	0.50	-.11	1.00									
3. Gender	0.53 [a]	0.50	.05	-.06	1.00								
4. Marital status	0.62 [a]	0.49	-.21**	-.10	-.05	1.00							
5. Citizenship	0.62 [a]	0.49	-.01	.53**	-.04	-.15**	1.00						
6. Academic Dis	0.68 [a]	0.47	-.30**	-.05	.26**	.06	-.16**	1.00					
7. VOE	3.94	0.59	-.03	.06	-.02	.11	0.09	.07	1.00				
8. CBS Support	3.73	0.69	-.14*	.05	.04	.12*	-.04	.18**	.59**	1.00			
9. CBS Barriers	2.23	0.60	.12*	-.15**	-.20**	-.05	-.16**	-.18**	-.35**	-.45**	1.00		
10. Rapport	4.20	0.71	-.12*	-.05	-.05	-.06	.05	-.04	.30**	.40**	-.30**	1.00	
11. CDSE	3.57	0.55	.00	.02	.04	.06	.11	.04	.66**	.53**	-.25**	.14*	1.00

Note. N= 313, [a] Dummy coded; for gender, female= 0 and male = 1; for ethnicity, non-White= 0 and White= 1; for marital status, Married or domestic partner= 0, Single =1; for citizenship, domestic =0 and international = 1; for academic discipline, social sciences= 0 and sciences and engineering= 1. *$p < .05$, **$p < .01$

Tests of hypotheses. A one-way analysis of covariate (ANCOVA) was conducted to answer the overarching quantitative research question: are there significant differences among ABD doctoral students' — (1) beliefs in their own abilities to make a career decision, (2) expected career outcomes, and (3) perceived environmental supports and barriers to pursue their sought careers based on chosen career paths — after adjusting for the effects of distal contextual variables? That is, a consistent aim of this study was to examine differences among ABD doctoral students that were based primarily on their chosen career paths and after removing the effects of distal contextual variables (e.g., gender, ethnicity, age). Preliminary assumptions should be met to run ANCOVA for each of the sub-research questions. Thus, the first goal was to test the assumptions of ANCOVA as the preliminary analysis level. Once the following assumptions were met, one-way ANCOVA was conducted to answer the research questions.

Differences in career decision-making self-efficacy (CDSE). In this section, a one-way ANCOVA aimed to answer the first sub-research question, "Are there differences in career decision-making self-efficacy based on sought career paths (faculty career and non-faculty career) after adjusting for the effects of distal contextual variables?" Specifically, the one-way between-groups ANCOVA was conducted to compare the levels of career decision-making self-efficacy (CDSE) based on students' sought career paths. The independent variable was the career path that ABD doctoral students pursue (faculty and non-faculty career), and the dependent variable consisted of scores on CDSE. Participants' gender, age, ethnicity, academic discipline, marital status, and citizenship were used as the covariates in this analysis.

ANCOVA assumption 1: Linear relationship. The ANCOVA model assumes that the relationship between the dependent variable, each covariate, and the relationships between pairs of covariates are linear (i.e., straight line) (Tabachnick & Fidell, 2010). To test this assumption,

scatterplots are used (Pallant, 2010). A total of 21 scatterplots (six for the relationship between each covariate and CDSE, and 15 for relationships between the pair of covariates) were plotted to test for linearity. There were linear relationships between each covariate and CDSE for each group of ABD doctoral students (faculty and non-faculty career groups) as well as linear relationships between the pair of covariates, as examined by a visual inspection of scatterplots. Figure 4.1 shows the examples of two scatterplots designed to examine the linearity between academic discipline and CDSE, and between academic discipline and gender.

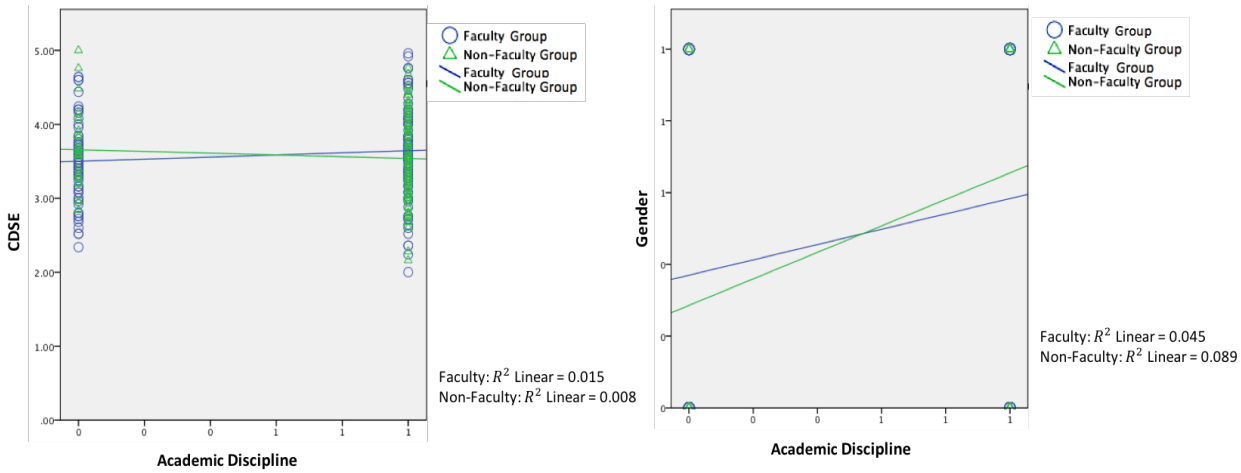

Figure 4.1. Linearity scatterplots

ANCOVA assumption 2: Homogeneity of regression slopes. The ANCOVA model is based that the relationship between the covariate and dependent variable for each of the groups. This model may determine whether there are similar slopes on the regression line for each group (Pallant, 2010). The heterogeneity of regression slopes indicates that there is an interaction between the covariate and independent variable. Such interaction implies that the relationship among the covariates and the dependent variable is different at different levels of the independent variable. This result may misinform the results of ANCOVA (Tabachnick & Fidell,

2013). This assumption was examined statistically by assessing whether there is a statistically significant interaction among the covariates and independent variables. Notably, the assumption is violated if the interaction is at the 95% of the significant level (Pallant, 2010). Table 4.9 presents the results of an analysis of the interaction between each covariate and independent variable (group).

Table 4.9

CDSE: Interactions of Covariates and the Independent Variable

Interaction	df	Mean Square	F
Group * Age	1	0.00	0.01
Group * Ethnicity	1	0.00	0.01
Group * Gender	1	0.30	1.01
Group * Marital Status	1	0.31	1.05
Group * Citizenship	1	0.13	0.45
Group * Academic Discipline	1	0.54	1.83
Error	286	0.30	

Note. *$p < .05$, **$p < .01$

As Table 4.9 revealed, there was homogeneity among the regression slopes as the interactions among covariates and independent variable were not statistically significant. Specifically, the results show $F(1, 286) = 0.01$, $p = .92$ for the interaction between age and group; $F(1, 286) = 0.01$, $p = .92$ for the interaction between ethnicity and group; $F(1, 286) = 1.01$, $p = .32$ for the interaction between gender and group; $F(1, 286) = 1.05$, $p = .31$ for the interaction between marital status and group; $F(1, 286) = 0.45$, $p = .50$ for the interaction between citizenship

and group; and F(1, 286) = 1.83, p =.18 for the interaction between academic discipline and group, which are greater than 0.05, meeting the second assumption.

ANCOVA assumption 3: Normality. Univariate group comparison tests, including ANCOVA, assume univariate normality (Warner, 2008). A skewness test measures the asymmetry of the distribution curve. A kurtosis test assesses whether the distribution is peaked or flat, as compared to a normal distribution (Hair et al., 2009). Graphical (e.g., normal probability plot, histogram) or non-graphical (e.g., Kolmogorov–Smirnov test, Shapiro–Wilks test, kurtosis and skewness statistics) tests can all be used to assess univariate normality (Cornelius & Harrington, 2014; Nimon, 2012). However, many researchers emphasize it to consider the impacts of a sample size on normality (Ghasemi & Zahediasl, 2012; Hair et al., 2009; Tabachnick & Fidell, 2013). In particular, Shapiro-Wilk and Kolmogorov-Smirnov statistics may be not reliable for assessing the normality of a large sample (e.g., n > 300, Kim, 2013). Thus, the ratios of the values of the skewness and kurtosis, to their respective errors, were used in this study. According to Kline (2005; 2010), interpreting the absolute value of the skew and kurtosis indices is an alternative approach to the ratio test (Cornelius & Harrington, 2014). Moreover, Kline (2010) considers absolute values of the skew index greater than 3.0 as "extremely skewed" (p.63). For kurtosis, Kline (2005) regards absolute values of the kurtosis index greater than 10.0 to be a problem, and the data may have non-normality.

According to Tabachnick and Fidell (2013), the formal inference tests are more likely to reject the normality if the sample size is large (n= 200 or more). This is true despite any minor deviation from normality because the standard errors of the skewness and kurtosis reduce as the sample size increases. It is preferable to check the shape of the distribution to determine normality if the sample size is large (Ghasemi & Zahediasl, 2012; Tabachnick & Fidell, 2013).

Subsequently, normal probability plots were used in this study along with the ratio test in order to determine normality through a shape of the distribution.

This study used standardized residuals (the differences among the obtained dependent and predicted values) to test the assumption of normality. If the actual raw data collected are normally distributed, the residuals are also normally distributed (Field, 2013; Tabachnick & Fidell, 2013). Thus, residuals can be used to determine normality also. Skewness and kurtosis values were calculated for CDSE in each group. The value of skewness and kurtosis for the faculty career group were 0.23 and 0.25, respectively. For the non-faculty career group, the values were 0.09 and 1.31. These results indicate that all of the skew or kurtosis values were below the limited recommended range. Further, Figure 4.2 presents normal probability plots, showing that the points on each plot produced a nearly linear pattern. Such patterns imply normal distribution.

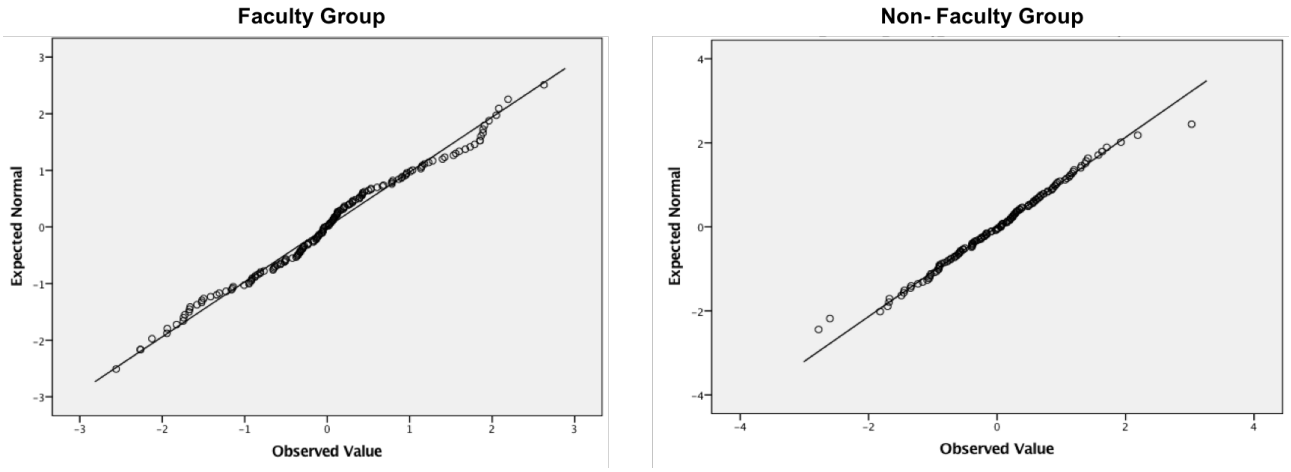

Figure 4.2. Normal probability plots for each group for CDSE

ANCOVA assumption 4: Outliers. Outlier analysis was performed to identify and examine any extreme values (outliers) that could influence the results drawn from the data

analyses. Outlier tests were conducted by investigating whether there were any cases with large standardized scores: z scores that were at outer ranges of the distribution. If the z-score is greater than 3.29, or less than -3.29, they were considered as potential outliers (Tabachnick & Fidell, 2013). The standardized residuals ranged from -2.78 to 3.03. None of the standardized residuals was outside the ± 3.29 range, indicating that there were no outliers present.

ANCOVA assumption 5: Homogeneity of variance. It is assumed in one-way ANCOVA that the error (residual) variances are equal for all of the independent variable groups (Tabachnick & Fidell, 2013). Levene's Test of Equality of Error Variances presents F (1, 298) = 0.34, p = .56, meeting the assumption of homogeneity of variance.

Preliminary analyses were conducted to ensure that there was no violation of the ANCOVA assumptions. Results from testing the assumptions of linearity, homogeneity of regression, normality, outliers, homogeneity of variance, and reliability of covariates were satisfactory.

One-way ANCOVA for CDSE. Since the ANCOVA assumptions were met, one-way ANCOVA was conducted to answer the first sub-research question. After adjustment by covariates, there was no significant difference between the two career path groups on CDSE scores. Table 4.10 summarizes with F (1, 292) = .80, p = .37, partial eta squared (η^2) = .003. The mean of the faculty career group was slightly higher than the mean of the non-faculty career group after controlling for the covariates. Further, Table 4.11 demonstrates the adjusted means, after controlling for the covariates, and the unadjusted mean for CDSE.

Additionally, there was a significant relationship between citizenship and CDSE. However, the strength of the relationship was weak, as indicated by a partial η^2 value of .02. Partial eta squared (η^2) evaluates the percentage of variance explained by each variable.

According to Cohen (1988), partial η^2 values of 0.01 indicate small effects, 0.06 represent medium effects, and greater than 0.14 represent large effects.

Table 4.10

Analysis of Covariance of CDSE

Source of Variance	Adjusted SS [a]	df	MS [b]	F	η^2
Sought Career Path	0.24	1	0.24	0.80	0.00
Intercept	149.15	1	149.15	505.21**	0.63
Covariates (adjusted for all effects)					
Age	0.14	1	0.14	0.46	0.00
Ethnicity	0.21	1	0.21	0.72	0.00
Gender	0.10	1	0.10	0.34	0.00
Marital Status	0.65	1	0.65	2.19	0.01
Citizenship	2.07	1	2.07	7.00**	0.02
Academic Discipline	0.69	1	0.69	2.33	0.01
Error	86.20	292	0.30		

Note. [a] SS= sum of square, [b] MS= mean square. *$p < .05$, **$p < .01$

Table 4.11

CDSE Adjusted and Unadjusted Means

Sought Career Path	N	Adjusted Mean	Unadjusted Mean
Faculty Career	164	3.60	3.59
Non-Faculty Career	136	3.54	3.56

Differences in vocational outcome expectations (VOE). In this section, a one-way ANCOVA was to answer the second sub-research question, "Are there differences in expected

career outcomes based on their sought career paths (faculty career and non-faculty career) after adjusting effects of distal contextual variables?" Specifically, the one-way between-groups ANCOVA was conducted to compare the levels of vocational outcome expectations (VOE) based on doctoral students' sought career paths. The independent variable was the career paths that ABD doctoral students pursue (faculty and non-faculty career), and the dependent variable consisted of scores on VOE. Participants' gender, age, ethnicity, academic discipline, marital status, and citizenship were used as the covariates in this analysis.

ANCOVA assumption 1: Linear relationship. To test this assumption, scatterplots are used. A total of six scatterplots for the relationship between each covariate and VOE were plotted to test for linearity. Scatterplots for relationships between the pair of covariates were examined in the previous section of ANCOVA for CDSE. There were linear relationships between each covariate and VOE for each group of ABD doctoral students (faculty and non-faculty career groups) as well as linear relationships between the pair of covariates, as examined by visual inspection of scatterplots. Figure 4.3 shows the example of one scatterplot plotted to examine linearity between marital status and VOE.

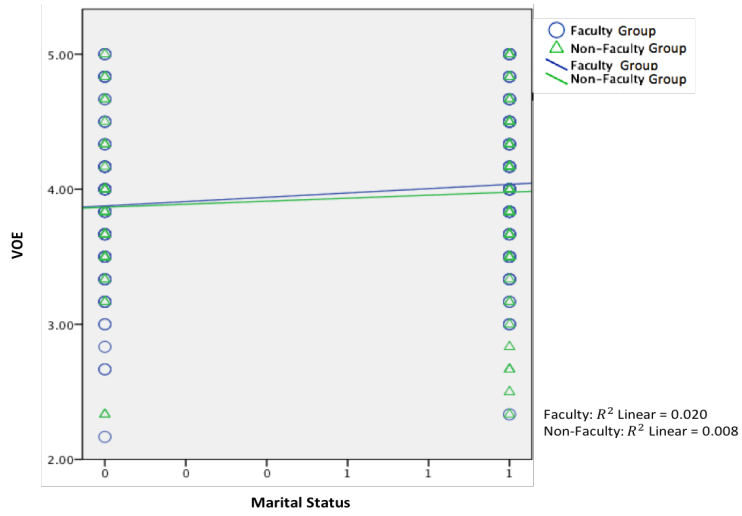

Figure 4.3. Linearity scatterplot between marital status and VOE

ANCOVA assumption 2: Homogeneity of regression slopes. This assumption was examined statistically by assessing whether there is a statistically significant interaction among the covariates and independent variables. This assumption is violated if the interaction is significant at the 95% of significant level (Pallant, 2010). Table 4.12 presents results of analysis of the interaction between each covariate and independent variable (group).

Table 4.12

VOE: Interactions of Covariates and the Independent Variable

Interaction	df	Mean Square	F
Group * Age	1	0.51	1.66
Group * Ethnicity	1	0.59	1.91
Group * Gender	1	0.07	0.24
Group * Marital Status	1	0.18	0.58
Group * Citizenship	1	0.08	0.25
Group * Academic Discipline	1	3.43	11.19**
Error	285	0.31	

Note. *$p < .05$, **$p < .01$

As Table 4.12 demonstrated, there was homogeneity of regression slopes as the interactions among the covariates and independent variable were not statistically significant. An exception is the interaction between academic discipline and group. Specifically, the results show $F(1, 285) = 1.66$, $p = .20$ for the interaction between age and group; $F(1, 285) = 1.91$, $p = .17$ for the interaction between ethnicity and group; $F(1, 285) = 0.24$, $p = .62$ for the interaction between gender and group; $F(1, 285) = 0.58$, $p = .45$ for the interaction between marital status and group; and $F(1, 285) = 0.25$, $p = .62$ for the interaction between citizenship and group, which

are greater than 0.05, meeting the second assumption. However, the interaction between academic discipline and group was statistically significant with F(1, 285) = 11.19, p =.001, violating the assumption of homogeneity of regression slopes. Thus, academic discipline was excluded from the list of covariates in this analysis because such interaction misleads the results of ANCOVA (Tabachnick & Fidell, 2013).

ANCOVA assumption 3: Normality. Skewness and kurtosis values were calculated for VOE in each group. The value of skewness and kurtosis for the faculty career group was -1 and 0.12, respectively. For the non-faculty career group, the values were–2.21 and 1.89. These results indicate that all of the skew or kurtosis values were below the recommended range limit (Kline, 2010). Further, Figure 4.4 presents normal probability plots, indicating that the points on each plot produced a nearly linear pattern. Such patterns imply normal distribution.

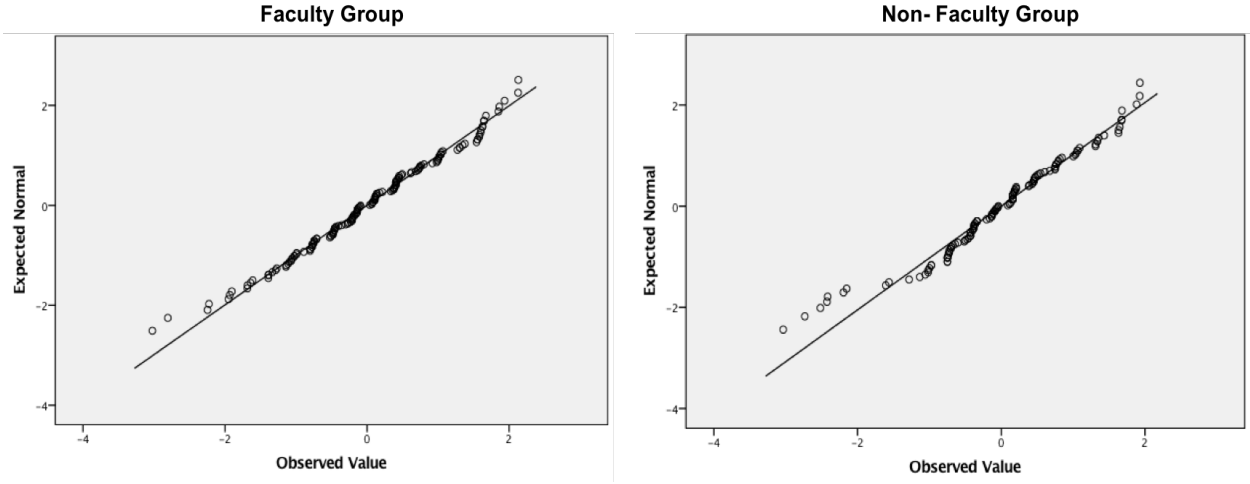

Figure 4.4. Normal probability plots for each group for VOE

ANCOVA assumption 4: Outliers. Using z scores from the outer ranges of the distribution, outlier analysis was performed to identify outliers that could influence the results drawn from the data analyses. The standardized residuals ranged from -3.64 to 2.09. There was one value that

was outside the ± 3.29 range. The individual in this case was a White female ABD student who was under 30-years old and studying in the field of science and engineering. Considering that self-efficacy has a strong and positive relation with outcome expectations (Lent et al., 2003), this individual had an extremely low score on VOE (2.00) while having a high score on CDSE (4.52). The suggestion is that this score may not reflect a true perspective from this individual. Accordingly, this value was considered as an outlier and excluded from the data analysis. After removing this value, all of the tests of assumptions were re-conducted (the previous three assumptions resulted after removing the outlier).

ANCOVA assumption 5: Homogeneity of variance. To test this assumption, Levene's Test of Equality of Error Variances was conducted. The assumption of homogeneity of variance was supported with F (1, 297) = 0.43, p = .51.

Preliminary analyses were conducted to ensure that there was no violation of the ANCOVA assumptions. Results of testing the assumptions of linearity, homogeneity of regression, normality, outliers, homogeneity of variance, and reliability of covariates were satisfactory.

One-way ANCOVA for VOE. The one-way ANCOVA was conducted to answer the second sub-research question. After adjustment by covariates, there was no significant difference between the two career path groups on VOE scores, as summarized in Table 4.13, with F (1, 292) = .18, p = .67, partial eta squared (η^2) = .001. The mean of the faculty career group was slightly higher than the mean of the non-faculty career group after controlling for the covariates. The adjusted means after controlling for the covariates and unadjusted mean for VOE are displayed in Table 4.14. Further, there was a significant relationship between marital status and VOE. However, the strength of the relationship was weak as indicated by a partial η^2 value of .01.

Table 4.13

Analysis of Covariance of VOE

Source of Variance	Adjusted SS [a]	df	MS [b]	F	η^2
Sought Career Path	0.06	1	0.06	0.18	0.00
Intercept	286.72	1	286.72	895.03**	0.75
Covariates (adjusted for all effects)					
Age	0.02	1	0.02	0.06	0.00
Ethnicity	0.04	1	0.04	0.12	0.00
Gender	0.02	1	0.02	0.05	0.00
Marital Status	1.32	1	1.32	4.12*	0.01
Citizenship	0.66	1	0.66	2.06	0.01
Error	93.54	292	0.32		

Note. *$p < .05$, **$p < .01$

Table 4.14

VOE Adjusted and Unadjusted Means

Sought Career Path	N	Adjusted Mean	Unadjusted Mean
Faculty Career	164	3.97	3.96
Non-Faculty Career	135	3.94	3.95

Differences in perceived environmental barriers (CBS-Barrier). In this section, a one-way ANCOVA was to answer part of the third sub-research question, "Are there differences in perceived environmental barriers and supports based on their sought career paths (faculty career and non-faculty career) after adjusting effects of distal contextual variables?" Specifically, the one-way between-groups ANCOVA was conducted to compare the levels of expected environmental barriers by using CBS scale based on doctoral students' sought career paths. The

independent variable was the career paths that ABD doctoral students pursue (faculty and non-faculty career), and the dependent variable consisted of scores on CBS-Barriers. Participants' gender, age, ethnicity, academic discipline, marital status, and citizenship were used as the covariates in this analysis.

ANCOVA assumption 1: Linear relationship. To test this assumption, scatterplots are used. A total of six scatterplots for the relationship between each covariate and CBS-Barriers were plotted to test for linearity. Scatterplots for relationships between the pair of covariates were examined in the previous section of ANVOCA for CDSE. There were linear relationships between each covariate and CBS-Barriers for each group of ABD doctoral students (faculty and non-faculty career groups) as well as linear relationships between the pair of covariates, as examined by visual inspection of scatterplots. Figure 4.5 shows the example of one scatterplot plotted to examine linearity between age and CBS-Barriers.

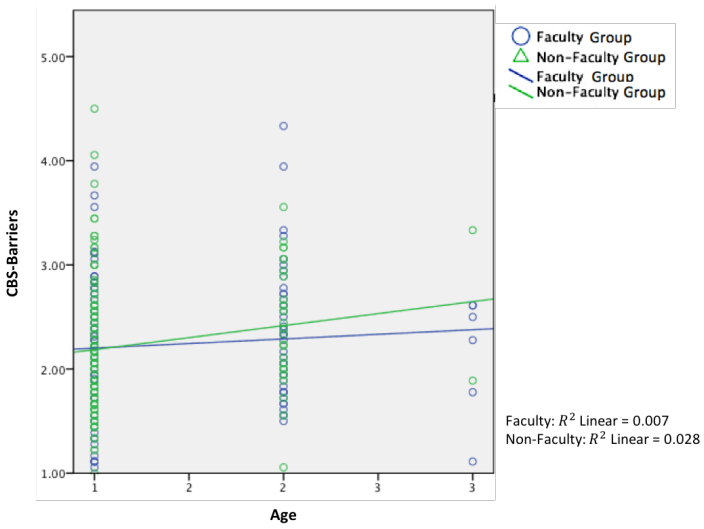

Figure 4.5. Linearity scatterplot between marital status and CBS-Barriers

ANCOVA assumption 2: Homogeneity of regression slopes. This assumption was examined statistically by assessing whether there is a statistically significant interaction among

the covariates and independent variables. Table 4.15 presents results of analysis of the interaction between each covariate and independent variable (group).

Table 4.15

CBS-Barriers: Interactions of Covariates and the Independent Variable

Interaction	df	Mean Square	F
Group * Age	1	0.24	0.77
Group * Ethnicity	1	0.18	0.59
Group * Gender	1	0.15	0.47
Group * Marital Status	1	2.19	7.05**
Group * Citizenship	1	0.00	0.01
Group * Academic Discipline	1	0.26	0.84
Error	285	0.31	

Note. *$p < .05$, **$p < .01$

As Table 4.15 indicated, there was homogeneity of regression slopes as the interactions among covariates and independent variable were not statistically significant. An exception is the interaction between marital status and group. Specifically, the results show $F(1, 285) = 0.77$, $p = .38$ for the interaction between age and group; $F(1, 285) = 0.59$, $p = .44$ for the interaction between ethnicity and group; $F(1, 285) = 0.47$, $p = .49$ for the interaction between gender and group; $F(1, 285) = 0.01$, $p = .94$ for the interaction between citizenship and group; and $F(1, 285) = 0.84$, $p = .36$ for the interaction between academic discipline and group, which are greater than 0.05, meeting the second assumption. However, the interaction between marital status and group was statistically significant with $F(1, 285) = 7.05$, $p = .008$, violating the assumption of homogeneity of regression slopes. Thus, marital status was excluded from the list of the

covariates in this analysis because such interaction misleads the results of ANCOVA (Tabachnick & Fidell, 2013).

ANCOVA assumption 3: Normality. Skewness and kurtosis values were calculated for CBS-Barriers in each group. The value of skewness and kurtosis for the faculty career group were 2.84 and 2.33 respectively, while for non-faculty career group the values were 2.70 and -0.05. These results indicate that all of the skew or kurtosis values were below the cutoff of range recommended. Further, Figure 4.6 presents normal probability plots showing that the points on each plot produced a nearly linear pattern. Such patterns imply normal distribution.

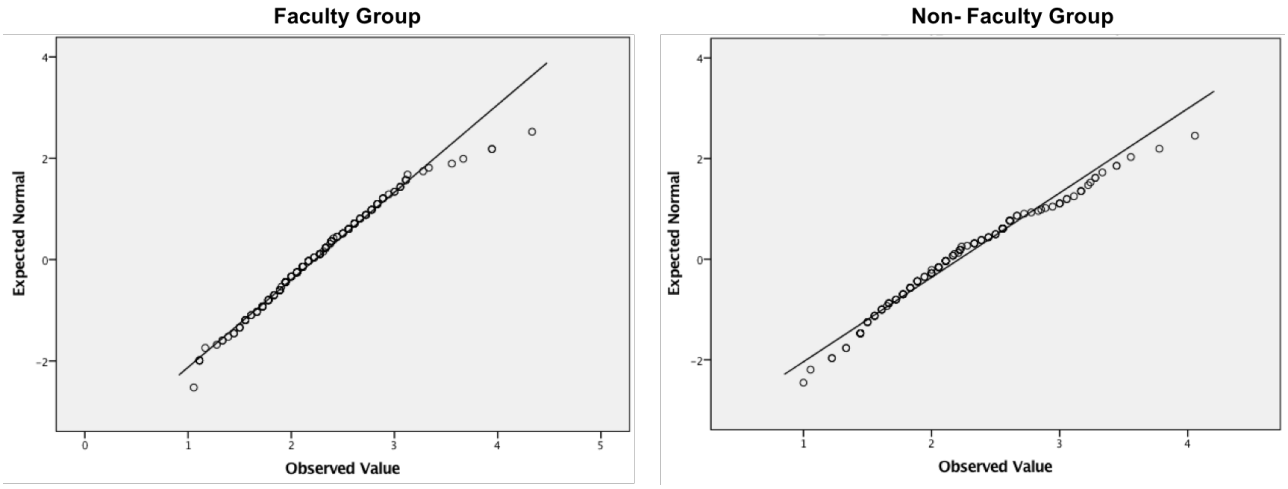

Figure 4.6. Normal probability plots for each group for CBS-Barriers

ANCOVA assumption 4: Outliers. Using z scores from the outer ranges of the distribution, outlier analysis was performed to identify outliers that could influence the results drawn from the data analyses. The standardized residuals ranged from -2.04 to 3.92. This scale had two values that were outside the ± 3.29 range. The individual A was a non-White married male who was under 30-years old studying in the field of science and engineering and another individual B was a non-White single male who was between 31 to 40 years old and studying in the field of science

and engineering. The individual A expressed the high levels of environmental barriers while having a high score on CDSE (4.96) and VOE (4.33). However, the high score on CBS-Barriers might be not unreasonable considering that this individual's lower score on rapport with a faculty advisor (2.45). Unlike the individual A, the individual B had extremely higher scores on every other scale. The suggestion is that this score may not reflect a true perspective. Accordingly, the value of the individual B was considered as an outlier and excluded from the data analysis. After removing this value, all of the tests of assumptions were re-conducted (the previous three assumptions resulted after removing the outlier).

ANCOVA assumption 5: Homogeneity of variance. To test this assumption, Levene's Test of Equality of Error Variances was conducted. The assumption of homogeneity of variance was supported with F (1, 301) = 0.122, p = .72.

Preliminary analyses were conducted to ensure that there was no violation of the ANCOVA assumption of linearity, homogeneity of regression, normality, outliers, homogeneity of variance, and reliability of covariates were satisfactory.

One-way ANCOVA for CBS-Barriers. The one-way ANCOVA was conducted to answer part of the third sub-research question. After adjustment by covariates, there was no significant difference between the two career path groups on CBS-Barriers scores, as summarized in Table 4.16, with F (1, 296) = .69, p = .41, partial eta squared (η^2) = .002. The mean of the non-faculty career group was slightly higher than the mean of the faculty career group after controlling for the covariates. The adjusted means after controlling for the covariates and unadjusted mean for CBS-Barriers are displayed in Table 4.17. As displayed in Table 4.16, there were significant relationships between gender and CBS-Barriers and between academic disciplines and CBS-Barriers. However, the strength of the relationships were relatively weak as indicated by a partial

η^2 value of .04 for between gender and CBS-Barriers and .02 for between academic discipline and CBS-Barriers.

Table 4.16

Analysis of Covariance of CBS-Barriers

Source of Variance	Adjusted SS	df	MS	F	η^2
Sought Career Path	0.22	1	0.22	0.69	0.00
Intercept	114.16	1	114.16	363.22	0.55
Covariates (adjusted for all effects)					
Age	0.83	1	0.83	2.64	0.01
Ethnicity	0.62	1	0.62	1.97	0.01
Gender	3.53	1	3.53	11.22*	0.04
Citizenship	1.15	1	1.15	3.65	0.01
Academic Discipline	1.83	1	1.83	5.826*	0.02
Error	93.03	296	0.31		

Note. *$p < .05$, **$p < .01$

Table 4.17

CBS-Barriers Adjusted and Unadjusted Means

Sought Career Path	N	Adjusted Mean	Unadjusted Mean
Faculty Career	165	2.20	2.23
Non-Faculty Career	138	2.26	2.22

Differences in perceived environmental support (CBS-Support). In this section, a one-way ANCOVA was to answer part of the third sub-research question, "Are there differences in perceived environmental barriers and supports based on their sought career paths (faculty career

and non-faculty career) after adjusting effects of distal contextual variables?" Specifically, the one-way between-groups ANCOVA was conducted to compare the levels of expected environmental support by using CBS scale based on their sought career paths. The independent variable was the career paths that ABD doctoral students pursue (faculty and non-faculty career), and the dependent variable consisted of scores on CBS-Support. Participants' gender, age, ethnicity, academic discipline, marital status, and citizenship were used as the covariates in this analysis.

ANCOVA assumption 1: Linear relationship. To test this assumption, scatterplots are used. A total of six scatterplots for the relationship between each covariate and CBS-Support were plotted to test for linearity. Scatterplots for relationships between the pair of covariates were examined in the previous section of ANVOCA for CDSE. There were linear relationships between each covariate and CBS-Support for each group of ABD doctoral students (faculty and non-faculty career groups) as well as linear relationships between the pair of covariates, as examined by visual inspection of scatterplots. Figure 4.7 shows the example of one scatterplot plotted to examine linearity between age and CBS-Support.

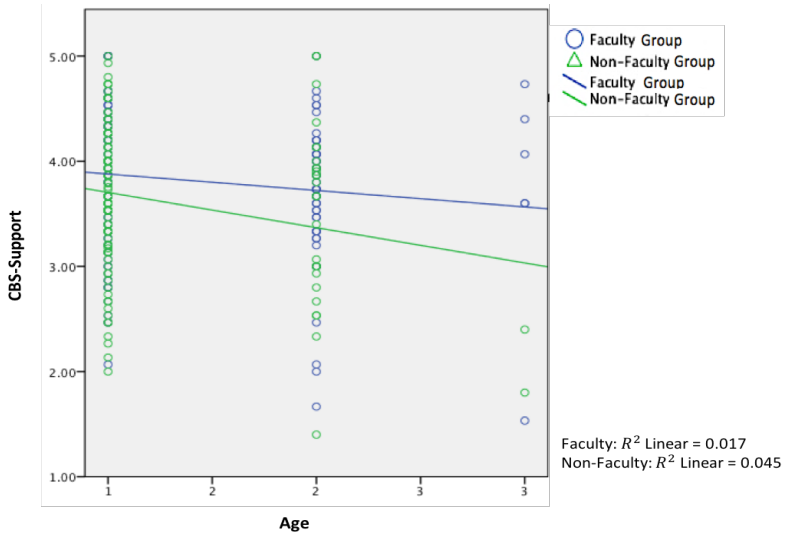

Figure 4.7. Linearity scatterplot between age and CBS-Support

ANCOVA assumption 2: Homogeneity of regression slopes. This assumption was examined statistically by assessing whether there is a statistically significant interaction among the covariates and independent variables. Table 4.18 presents results of analysis of the interaction between each covariate and independent variable (group).

Table 4.18

CBS-Support: Interactions of Covariates and the Independent Variable

Interaction	df	Mean Square	F
Group * Age	1	0.85	1.99
Group * Ethnicity	1	0.02	0.04
Group * Gender	1	1.33	3.09
Group * Marital Status	1	1.53	3.56
Group * Citizenship	1	0.02	0.06
Group * Academic Discipline	1	0.03	0.08
Error	286	0.43	

Note. *$p < .05$, **$p < .01$

As Table 4.18 indicated, there was homogeneity of regression slopes as the interactions among covariates and independent variable were not statistically significant. Specifically, the results show F(1, 286) = 1.99, p =.16 for the interaction between age and group; F(1, 286) = 0.04, p =.85 for the interaction between ethnicity and group; F(1, 286) = 3.09, p =.08 for the interaction between gender and group; F(1, 286) = 3.56, p =.06 for the interaction between marital status and group; F(1, 286) = 0.06, p =.81 for the interaction between citizenship and group; and F(1, 286) = 0.08, p =. 79 for the interaction between academic discipline and group, which are greater than 0.05, meeting the second assumption.

ANCOVA assumption 3: Normality. Skewness and kurtosis values were calculated for CBS-Support in each group. The value of skewness and kurtosis for the faculty career group were -3.06 and 1.16, respectively. The non-faculty career group values were -1.77 and 1.27. The value of skewness of the faculty career group was outside the recommended range limit. However, violation of the assumption of normality should not be considered as a major problem with large samples (e.g., hundreds of observations, Altman & Bland, 1995; Ghasemi & Zahediasl, 2012). Formal inference tests are more likely to reject normality if the sample size is large (n= 200 or more). This may be true although there is a minor deviation from normality because the standard errors of skewness and kurtosis reduce as the sample size increases (Tabachnick & Fidell, 2013). Further, Figure 4.8 presents normal probability plots, illustrating that the points on each plot produced a nearly linear pattern. This illustration suggests normal distribution. The analysis was conducted despite a partially violated normality assumption.

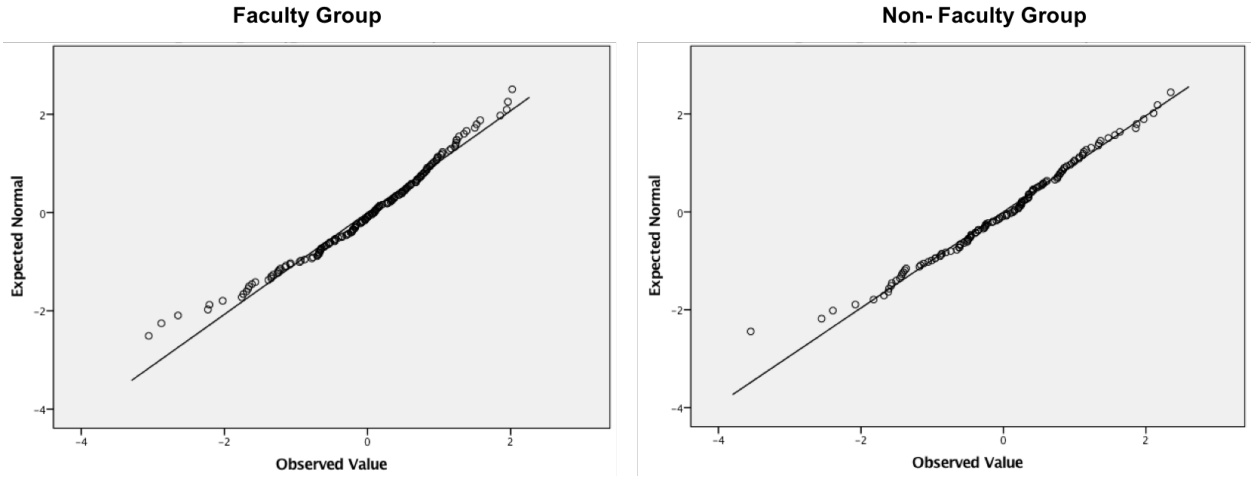

Figure 4.8. Normal probability plots for each group for CBS-Support

ANCOVA assumption 4: Outliers. Outlier analysis was performed to identify outliers by using z scores that were at the outer distribution ranges. The standardized residuals ranged from

-3.55 to 2.35. This scale had one value that was outside the ± 3.29 range. The individual was a White single male who was between 31- 40 years old and studying in the field of science and engineering. The individual expressed a lower level of environmental support (1.40). Another support scale, rapport with a faculty advisor, was consistently lower (2.00). The level of career barriers expressed by this individual was higher (3.56). Considering that perceived supports and barriers are negatively-related constructs (Lent et al., 2003), the scores on these scales seem reasonable. Further, this individual did not have extremely higher scores on other scales, suggesting that this score may reflect a true perspective for this individual. Thus, this value of the individual was not considered as an outlier and was included for the data analysis.

ANCOVA assumption 5: Homogeneity of variance. To test this assumption, Levene's Test of Equality of Error Variances was conducted. The assumption of homogeneity of variance was supported with F (1, 298) = 0.435, p = .51.

Preliminary analyses were conducted to ensure that there was no violation of the ANCOVA assumption of linearity, homogeneity of regression, normality, outliers, homogeneity of variance, and reliability of covariates were satisfactory.

One-way ANCOVA for CBS-Support. The one-way ANCOVA was conducted to answer part of the third sub-research question. After adjustment by covariates, there was a significant difference between the two career path groups on CBS-Support scores, as summarized in Table 4.19, with F (1, 292) = 10.29, p = .001. However, the strength of the relationship between adjusted CBS-Support and career path was weak with partial eta squared (η^2) = .03. The adjusted means after controlling for the covariates and unadjusted mean for CBS-Support are displayed in Table 4.20, which shows that ABD doctoral students pursuing a faculty career path perceived the higher degrees of environmental support than those who pursue non-faculty career

path after controlling for the covariates. Further, as displayed in Table 4.19, there was a significant relationship between academic discipline and CBS-Support. The strength of the relationships were relatively weak, however, with a partial η^2 value of .04.

Table 4.19

Analysis of Covariance of CBS-Support

Source of Variance	Adjusted SS	df	MS	F	η^2
Sought Career Path	4.46	1	4.46	10.29**	0.03
Intercept	174.87	1	174.87	403.70**	0.58
Covariates (adjusted for all effects)					
Age	0.99	1	0.99	2.27	0.01
Ethnicity	0.84	1	0.84	1.95	0.01
Gender	0.03	1	0.03	0.08	0.00
Marital Status	1.56	1	1.56	3.61	0.01
Citizenship	0.05	1	0.05	0.12	0.00
Academic Discipline	4.92	1	4.92	11.37**	0.04
Error	126.483	292	0.433		

Note. *$p < .05$, **$p < .01$

Table 4.20

CBS-Support Adjusted and Unadjusted Means

Sought Career Path	N	Adjusted Mean	Unadjusted Mean
Faculty Career	164	3.86	3.81
Non-Faculty Career	136	3.60	3.66

Differences in the rapport with a faculty advisor. In this section, a one-way ANCOVA was to answer part of the third sub-research question, "Are there differences in rapport with a faculty advisor based on their sought career paths (faculty career and non-faculty career) after adjusting effects of distal contextual variables?" Specifically, the one-way between-groups ANCOVA was conducted to compare the levels of the perceived rapport with a faculty advisor by using the rapport scale based on their sought career paths. The independent variable was the career paths that ABD doctoral students pursue (faculty and non-faculty career), and the dependent variable consisted of scores on the rapport. Participants' gender, age, ethnicity, academic discipline, marital status, and citizenship were used as the covariates in this analysis.

ANCOVA assumption 1: Linear relationship. To test this assumption, scatterplots are used. A total of six scatterplots for the relationship between each covariate and the rapport were plotted to test for linearity. Scatterplots for relationships between the pair of covariates were examined in the previous section of ANVOCA for CDSE. There were linear relationships between each covariate and CBS-Support for each group of ABD doctoral students (faculty and non-faculty career groups) as well as linear relationships between the pair of covariates, as examined by visual inspection of scatterplots. Figure 4.9 shows the example of one scatterplot plotted to examine linearity between citizenship and the rapport.

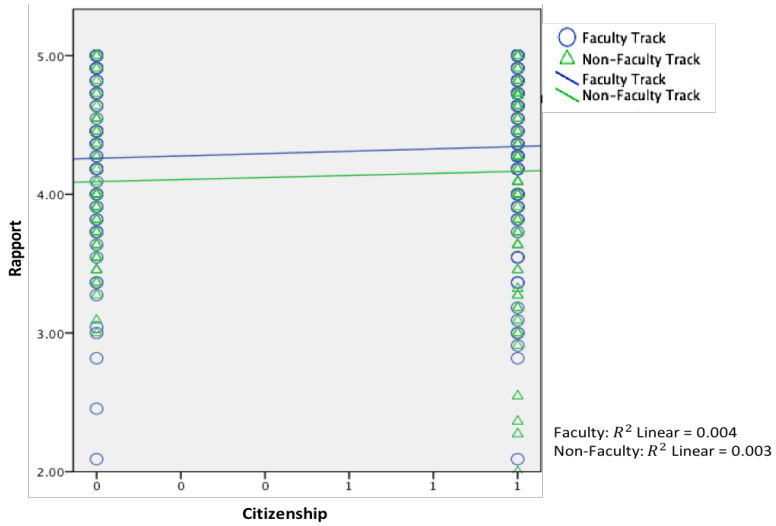

Figure 4.9. Linearity scatterplot between citizenship and Rapport

ANCOVA assumption 2: Homogeneity of regression slopes. This assumption was examined statistically by assessing whether there is a statistically significant interaction between the covariates and independent variables. Table 4.21 presents results of analysis of the interaction between each covariate and independent variable (group).

Table 4.21

Rapport: Interactions of Covariates and the Independent Variable

Interaction	df	Mean Square	F
Group * Age	1	0.07	0.17
Group * Ethnicity	1	0.28	0.71
Group * Gender	1	0.15	0.37
Group * Marital Status	1	0.63	1.58
Group * Citizenship	1	0.20	0.50
Group * Academic Discipline	1	0.17	0.42
Error	284	0.40	

Note. *$p < .05$, **$p < .01$

As Table 4.21 indicated, there was homogeneity of regression slopes as the interactions among covariates and independent variable were not statistically significant. Specifically, the results show F(1, 284) = 0.17, p =.68 for the interaction between age and group; F(1, 284) = 0.71, p =.40 for the interaction between ethnicity and group; F(1, 284) = 0.37, p =.54 for the interaction between gender and group; F(1, 284) = 1.58, p =.21 for the interaction between marital status and group; F(1, 284) = 0.50, p =.48 for the interaction between citizenship and group; and F(1, 284) = 0.42, p =. 52 for the interaction between academic discipline and group, which are greater than 0.05, meeting the second assumption.

ANCOVA assumption 3: Normality. Skewness and kurtosis values were calculated for rapport in each group. The value of skewness and kurtosis for the faculty career group were -5.04 and 1.73, respectively. For the non-faculty career group, the values were -2.95 and 0.33. The values of skewness for both groups were outside the recommended range limit. However, violation of the assumption of normality should not be considered as a major problem with large samples (e.g., hundreds of observations, Altman & Bland, 1995; Ghasemi & Zahediasl, 2012; Tabachnick & Fidell, 2013). Further, Figure 4.10 presents normal probability plots, showing that the points on each plot produced a nearly linear pattern. This finding suggests normal distribution. Thus, the analysis was conducted despite a partially violated normality assumption.

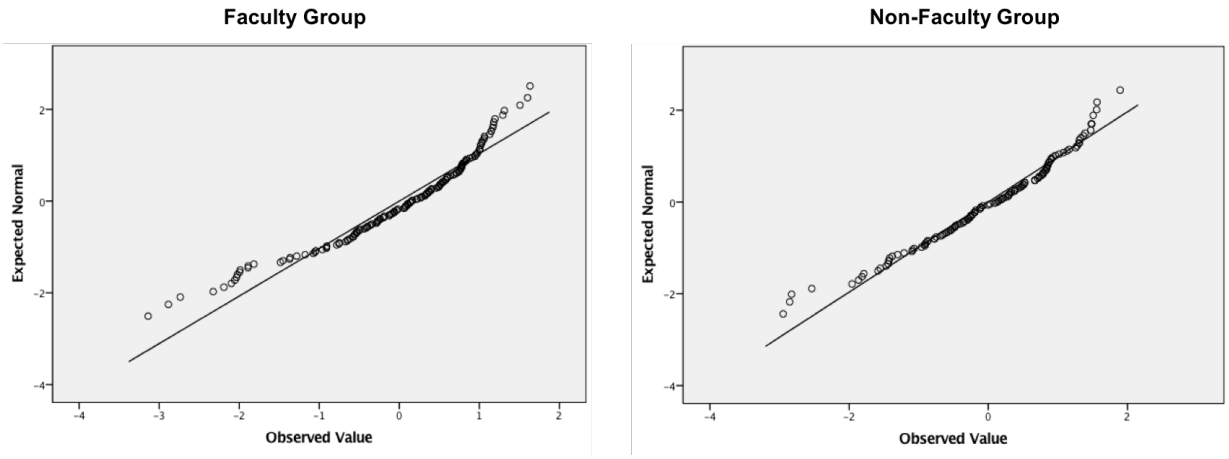

Figure 4.10. Normal probability plots for each group for Rapport

ANCOVA assumption 4: Outliers. The standardized residuals ranged from -4.63 to 1.88. This scale had two values with z-score that were greater than 4.0. If a z-score is larger than 4, it should be considered as a very extreme case, indicating a clear outlier (Reis & Judd, 2014). Thus, these two values were excluded from the data analysis. After removing this value, all of the tests of assumptions were re-conducted (previous three assumptions for the rapport were results after removing the outliers).

ANCOVA assumption 5: Homogeneity of variance. To test this assumption, Levene's Test of Equality of Error Variances was conducted. The assumption of homogeneity of variance was supported with F (1, 296) = 0.875, p = .35.

Preliminary analyses were conducted to ensure that there was no violation of the ANCOVA assumption of linearity, homogeneity of regression, normality, outliers, homogeneity of variance, and reliability of covariates were satisfactory.

One-way ANCOVA for the rapport. The one-way ANCOVA was conducted to answer part of the third sub-research question. After adjustment by covariates, there was a significant difference between the two career path groups on the rapport scores, as summarized in Table

4.22, with F (1, 290) = 4.07, p = .04. However, the strength of the relationship between adjusted CBS-Support and career path was weak with partial eta squared (η^2) = .01. The adjusted means after controlling for the covariates and unadjusted mean for the rapport are displayed in Table 4.23, which shows that ABD doctoral students pursuing a faculty career path perceived the higher degrees of the rapport with a faculty advisor than those who pursue non-faculty career path after controlling for the covariates.

Further, as displayed in Table 4.22, there were significant relationships between age and the adjusted rapport. However, the strengths of the relationships were relatively weak as indicated by a partial η^2 value of .03 for between age and the rapport and .02 for between ethnicity and the rapport.

Table 4.22

Analysis of Covariance of Rapport

Source of Variance	Adjusted SS	df	MS	F	η^2
Sought Career Path	1.61	1	1.61	4.07*	0.01
Intercept	305.88	1	305.88	774.11**	0.73
Covariates (adjusted for all effects)					
Age	2.98	1	2.98	7.54*	0.03
Ethnicity	2.40	1	2.40	6.08*	0.02
Gender	0.36	1	0.36	0.91	0.00
Marital Status	0.80	1	0.80	2.03	0.01
Citizenship	1.18	1	1.18	2.99	0.01
Academic Discipline	0.24	1	0.24	0.61	0.00
Error	114.59	290	0.40		

Note. *p < .05, **p < .01

Table 4.23

Rapport Adjusted and Unadjusted Means

Sought Career Path	N	Adjusted Mean	Unadjusted Mean
Faculty Career	164	4.31	4.31
Non-Faculty Career	134	4.15	4.15

Chapter Summary

One overarching research question and three sub-questions guided the inquiries in this chapter:

1. Given the theoretical grounding of SCCT, are there significant differences in ABD doctoral students′ belief in their own abilities to make a career decision, and expected career outcomes, and perceived environmental supports and barriers to pursue their sought careers based on their sought career paths after adjusting effects of distal contextual variables?
    - Are there differences in career decision-making self-efficacy based on their sought career paths (faculty career and non-faculty career) after adjusting effects of distal contextual variables?
    - Are there differences in expected career outcomes based on their sought career paths (faculty career and non-faculty career) after adjusting effects of distal contextual variables?
    - Are there differences in perceived environmental barriers and supports based on their sought career paths (faculty career and non-faculty career) after adjusting effects of distal contextual variables?

Quantitative data were sought from 1,200 ABD doctoral students at USMU. An effective response rate of about 26% was obtained. Preliminary analyses, aimed to verify the quality of gathered data, were described before reporting descriptive statistics and instrument reliability.

The results of the one-way ANCOVA addressed the research questions. First, ABD doctoral students, who pursue faculty careers (faculty career group, 3.60), reported a slightly higher level of career decision-making self-efficacy (CDSE) than those who pursue non-faculty careers (non-faculty career group, 3.54). However, there was no significant difference in CDSE

between two groups after controlling all six covariates. Moreover, there was a significant but weak relationship between citizenship and CDSE. That is, when removing the effects of distal contextual variables, including age, gender, ethnicity, marital status, citizenship, and academic disciplines, there are no significant differences in CDSE by ABD doctoral students' sought career paths. Notably, analysis revealed that ABD doctoral students' citizenship status (domestic or international) might influence perceived levels of CDSE.

Second, the faculty career group (3.97) reported a slightly higher level of vocational outcome expectations (VOE) than the non-faculty career group (3.94). However, there was no significant difference in VOE between two groups after controlling all five covariates (academic discipline was excluded from the list of covariates due to a violation of regression slope homogeneity). Moreover, there was a significant but weak relationship between marital status and VOE. That is, when removing the effects of distal contextual variables, there is no significant difference in VOE by ABD doctoral students' sought career paths. Notably, analysis revealed that ABD doctoral students' marital status (single or married) might influence perceived levels of VOE.

Finally, this study found significant differences in the perceived environmental support by group but not in the perceived environmental barriers. As for perceived career barriers (CBS-Barriers), there was no significant difference by groups after controlling all five covariates (marital status was excluded from the list of covariates due to the violation of homogeneity of regression slopes). The non-faculty career group (2.26) reported a slightly higher level of career barriers than the faculty career group (2.20). However, there were significant but weak relationships between gender and career barriers, and between academic disciplines, indicating

that ABD doctoral students' gender and academic discipline may influence perceived levels of career-barriers.

The one-way ANCOVA of career supports, including the level of the perceived career support, and rapport with a faculty advisor, revealed significant differences between two groups after controlling all six covariates. Specifically, ABD doctoral students, pursuing a faculty career path, perceived higher degrees of career support (3.86) and rapport (4.31) than those pursuing a non-faculty career path (3.60, 4.15 respectively). That is, students' sought career paths may significantly relate to how they perceive environmental supports and rapport with a faculty advisor. However, the strength of the relationship between CBS-Support and sought career path, as well as relationships between the rapport and sought career path, were relatively small. Further, the study revealed that ABD doctoral students' academic disciplines might influence their perceived levels of career-support. Additionally, age and ethnicity may influence rapport with their faculty advisor.

Chapter 5

Results of Qualitative Study

This chapter presents the results of the qualitative study in the following two primary sections. First, this chapter begins with findings as a result of qualitative pilot study and the improvement made to the full study. Then, the second section presents the results of qualitative data analysis.

Results of Qualitative Pilot Study

To ensure the feasibility and quality of interview instruments, eight participants, who completed the pilot surveys, were invited for one-on-one pilot interviews. In this section, findings of the pilot interviews and the revisions made for the full study are discussed. Specifically, it opens with brief demographic distribution of the pilot interview participants. It is followed by the time that participants spent completing the interviews, and identifies the modifications made to the full study as a result of feedback collected from the interview participants. This information pertains to the interview design, including interview questions and flow.

Demographics information. Among eight participants, two of them were domestic doctoral students and the other six were international doctoral students. Four participants indicated non-faculty career paths as their primary career choices while the remaining four reported faculty career paths as primary choices. Four participants were from the College of Education, but their majors were all different such as Higher Education, Human Resource Development, Special Education, and Counseling Psychology. The other four participants were from different colleges including the College of Liberal Arts and Sciences with Physics major

and Psychology major, School of Social Work, and Applied Health Sciences with Recreation, Sport & Tourism major. Seven of them were single and one married without children.

Time participants spent completing the interviews. With participants' permissions, the researcher recorded the interviews, which enabled to keep track of the time it took to complete the pilot interview for each participant. The average time for the interview was 68 minutes. The longest was 110 minutes (one hour and 50 minutes) and the shortest was 48 minutes.

Feedback and modifications made to full study interview. The researcher collected feedback in the following three ways. First, the researcher collected feedback during the interview, as follows: 1) when each participant asked a certain question again for clarification; and 2) when participants asked why they were being asked a certain question. Following all interviews, the researcher contacted one previous interviewee and requested an in-depth review session. The interviewee and researcher went through all questions together for 90 minutes. During this session, the researcher also asked the interviewee's opinions on some questions that she had marked when she observed relatively longer silent moments during the interviews.

During the interviews. Among the eight participants, four of them asked again for clarification regarding questions in the section about identifying career gaps. Regarding the first question in this section, '*could you describe what is the your most desired career now (where do you want to be) and where do you believe your current status?,*' two of them asked whether "the most desired career now" was the same as a primary career choice previously mentioned. Three participants reported that the question did not sound like spoken language so it was difficult to understand when they were asked the first time. They requested more specific wording.

In addition to the direct comments offered by the participants, the researcher observed that half of the participants (n=4) explained why their career choices changed or remained

throughout their program without any facilitation by the researcher after they responded to the initial three questions regarding his or her post-graduate career choice 1) before entering his or her doctoral program, 2) during their program, and 3) today. It seemed helpful for participants to reflect on their previous career choices. Thus, the researcher decided to add an additional introduction question before asking the CASVE cycle-guided questions. Table 5.1 provides the summary of the implications made to the full study interview as a result of the feedback during the interviews. The updated interview protocol is available in Appendix E.

Table 5.1

Feedback Collected During the Interviews and the Improvement Made to Full Study Interview

Area Received Feedback	Before Feedback	After Feedback
Introduction (Warming-up question)	Add one more question	'Could you explain how and why your career choices have been changed throughout the doctoral program?' • (If the choice is consistent), 'Could you explain why your career choice is consistent throughout the doctoral program?'
The first questions within the section of identifying career gap	'Could you describe what is the your most desired career now (where do you want to be) and where do you believe your current status?'	'Could you more specifically describe where you want to be, *name of your current career choice*, and where you believe you are now (current status) in terms of your career after graduation (in terms of your career goals)?'

During the review session. In an effort to present the interview as more of a conversational flow rather than as a formal question and answer session, the researcher modified

the interview questions by conducting a review session. After the all interviews were complete, one previous interviewee was invited to the review session as a reviewer. Prior to the review session, the researcher encouraged the reviewer to reflect on her experience as the interview participant and asked her to share her opinion when she reviewed each question. The researcher also shared her interview observations. As a result of the session, there were five major modifications made to the full study. All changes can be found in the modified interview protocol Appendix E. In this section, the major changes are discussed.

Prior to discussing each interview question, two general aspects of the interview questions were discussed. First, several expressions and the order of interview questions were changed to make the interview flow like a conversation. For example, the reviewer pointed to the following two repeated expressions throughout the interview questions: 1) your current career choice; and 2) factors. After the discussion, the expression, '*your current career choice*' in all of the interview questions was replaced with a specific type of primary career choice that each participant chose (e.g., faculty in a research institution, industry). In this way, the researcher could remind participants of their primary career choice. More importantly, it might assist participants to focus on their primary career choice during the interview. Also, the reviewer shared that when she was in the interview, the word, *factors*, sounded quite conceptual rather than concrete. Thus, in order to make interview questions to be easier for participants to understand, the word, *factors*, was replaced with a word tailored to the context of the questions. For example, the sentence used for the transition from the section of identifying a career gap to the section of understanding knowledge of self and options, '*I would like to know factors you considered before making a career choice*', was revised as '*let's talk about your life and career now*.'

Second, considering the relative length of the interview, the reviewer recommended adding more transitional points to provide participants with a clear moment of transition between sections and between questions, so that they might understand where they are in the process and to anticipate what kinds of questions they may receive.

In addition to the feedback regarding the overall flow and expressions, there were three major changes to specific questions. First, the second question in the section of identifying career gaps (communication phase), '*what events or factors influence your current career choice?*' was discussed. The reviewer identified that the meaning of 'events or factors' was relatively conceptual and broad so that it might be unable to deliver the clear meaning to participants. To enhance the clarity of the meaning of the question, it has been changed to '*life events or any turning points*.' In addition, the original question focused more attention to events rather than on the participants. To facilitate the participants' reflections on their behaviors, as regards the cues that facilitated their primary career choice, the question was changed to '*did you have any life events or any turning points that made you decide to pursue your primary career choice, _____? If so, could you share it with me?*'

In the section on understanding knowledge of self and options (analysis phase), question 8, '*do you think these factors we just discussed influence your current career decision? If yes, could you share how they impacted your career choice?,*' was changed to '*we've talked about your interest, value, abilities, your employment preferences, and various roles that your have in your life. Could you tell me how you felt about this whole conversation? Any feelings or any thoughts?*' The previous wording of the question might force participants to believe that there should be a connection between their career and themselves. Instead, by asking an open question, they are invited to reflect, and consequently, participants may be more comfortable talking about

their perceptions on what they discussed previously. The data analysis would lead to identifying whether these factors link to each other, which ultimately, informs theory and practice.

Lastly, one more interview question, '*how do you feel about your primary career choice, _____ while you are doing the activities (something they mentioned in the previous stage)?*' was added to the section on communicating to myself (communication2 phase). Since participants of this study were more likely to be at a job seeking stage, it was highly likely that they would not be at the stage of returning to the communication phase (to determine if s/he makes a good career choice). Thus, this newly added question would encourage participants to share their reflections on their pursuit of a primary career choice during their involvement in employment activities. Also, this question helped participants to transit from the section on executing my primary career choice to the section on communicating to myself. All changes can be found in the updated interview (See Appendix E).

Results of Full Qualitative Study Data Analysis

After the feasibility and quality of interview instruments were achieved through the pilot study, the full qualitative study was conducted by interviewing 30 participants who had participated in the surveys and agreed to participate in the one-on-one interview.

Demographics information. A total of 30 interviews were conducted. Among them, 15 participants reported to seek faculty career paths consisting of faculty in a teaching institution or faculty in a research institution. The remaining 15 reported to pursue non-faculty career paths and their career paths consisted of administrative positions in higher education institutions, researchers in research institutions, industry (business sector), and government employees. The majority of the participants were between 4th and 5th year of their doctoral programs. Table 5.2 provides an overview of interview participants' demographic information as reported on the

survey, demonstrating the variety achieved. Note that over half the interview participants in each group reported as single and under the age of 30, and that the majority of the participants identified as either White or Asian in each group.

Table 5.2

Interview Participant Demographics of the Study by Group

Variables	Values	Faculty Career Group	Non-Faculty Career
Academic	Science and Engineering	8	9
Discipline	Social Science and Humanities	7	6
Citizenship	Domestic	7	8
	International	8	7
Marriage/civil	Single	11	8
Partnership Status	Married or domestic partnership	4	7
Children	Yes	3	3
	No	12	12
Age Range	25-30	7	12
	31-35	3	1
	36-40	-	1
	41-45	1	1
Gender	Male / Man	8	7
	Female / Woman	7	8
Ethnic Identity	White	6	6
	Asian	7	5
	Hispanic or Latino	1	1
	Black or African American	1	3
Total		15	15

Time participants spent completing the interviews. With participants' permissions, the researcher recorded the interviews, which enabled to keep track of the time it took to complete the interview for each participant. The average time for the interview was 41 minutes. The longest was 72 minutes (one hour and 12 minutes) and the shortest was 22 minutes.

Inter-rater reliability results. As discussed in Chapter 3, the two coders independently coded the randomly-selected transcript to examine the inter-reliability between the two coders. By using a Kappa statistic (Cohen, 1960), the inter-rater reliability between the two raters was measured. If inter-rater reliability was lower than .80, the two coders discussed to clarify the discrepancy between them during the analysis process. Then the raters re-conducted the analysis by using the modified coding guide and the coding process was repeated until the inter-rater reliability reaches .81. Table 5.3 provides the inter-rater reliability results.

Table 5.3

RQ2: Inter-rater Reliability (Kappa) of Each Phase by Coding Round

Round	CASVE Decision-Making Cycle Phase						
	Intro	Communication	Analysis	Synthesis	Valuing	Execution	Communication2
1 [a]	–	–	–	–	–	–	–
2 [a]	–	–	–	–	–	–	–
3	0.68	0.74	0.67	0.85	1.00	1.00	1.00
4	1.00	0.88	0.92				

Note. [a] = During the analysis, the coders interacted with one another to make sense of the analysis process as well as to reach a consensus on the given definitions of coding guide. Thus, the inter-rater reliability was not examined.

Internal career decision-making processes of doctoral students. Directed content analysis (DCA) was conducted to address the overarching quantitative research question—what

are all but dissertation (ABD) doctoral students' internal cognitive processes, guided by CIP theory's CASVE cycle, for deciding to pursue a faculty or non-faculty career, respectively? The findings of DCA were presented by providing major themes identified from each phase with graphs to show key construct distributions of each phase of the CASVE cycle. Verbatim responses that are aligned with the themes were also presented. Evidence was drawn primarily from 30 interview participants (15 participants are pursuing faculty career paths, and the other 15 participants are pursuing non-faculty career paths). Table 5.4 presents the profiles of the interview participants of the study. Pseudonyms were used to protect the participants' identity and privacy.

This particular study begins by exploring emergent patterns from participants' expressed career decision-making processes. It was conducted without any guidance of the CASVE decision-making cycle (referred to as "introduction" in this study). This exploration is followed by primary patterns that emerged in each CASVE cycle phase, which derive from the in-depth structured interviews. The major emphasis of each phase is a synthesis of ideas derived from comparisons of participants' experiences based on their sought career paths. Table 5.5 presents the definition of each phase of the CASVE cycle used in the study. Appendix F provides more details about the definitions of all codes used in the study.

Table 5.4

Profiles of the Interview Participants

Group	Pseudonym	Specific Primary Career Path [a]	Gender	Academic Discipline [b]	Marriage Status	Children	Citizenship	Ethnicity
Faculty Career	Ami	TU faculty	Female	SS&H	Single	No	International	Asian
	Billy	RU faculty	Female	SS&H	Single	No	Domestic	Black/African American
	Chloe	RU faculty	Male	S&E	Married	Yes	Domestic	White
	Eli	TU faculty	Female	SS&H	Single	No	International	Asian
	Fiona	RU faculty	Male	S&E	Married	Yes	International	Asian
	Kari	RU faculty	Male	SS&H	Single	No	Domestic	White
	Marc	TU faculty	Male	S&E	Single	No	International	White
	Minhyuk	RU faculty	Female	SS&H	Single	No	International	Asian
	Neo	RU faculty	Male	S&E	Married	No	International	White
	Nia	RU faculty	Female	S&E	Single	No	International	White
	Ping	RU faculty	Female	SS&H	Single	No	Domestic	Hispanic or Latino
	Soojin	RU faculty	Female	S&E	Single	No	Domestic	Asian
	Ting	TU faculty	Female	S&E	Single	No	International	Asian
	Troy	RU faculty	Male	SS&H	Married	Yes	Domestic	White
	Victor	RU faculty	Male	S&E	Single	No	Domestic	Asian

Table 5.4 (cont.)

Non-faculty Career	Alfred	Government	Male	S&E	Single	No	International	Hispanic or Latino
	Brenda	Government	Female	SS&H	Married	Yes	Domestic	White
	Cam	Administrative	Female	SS&H	Married	No	International	White
	Dorothy	Industry	Female	SS&H	Married	No	Domestic	Black/African American
	Ella	Administrative	Male	S&E	Married	Yes	Domestic	White
	Erland	Industry	Female	S&E	Single	No	International	White
	Grace	Industry	Female	S&E	Married	Yes	Domestic	White
	Hailey	Administrative	Female	SS&H	Single	No	Domestic	Asian
	Jack	Administrative	Male	S&E	Single	No	International	Asian
	Joshua	Researcher	Male	SS&H	Married	No	Domestic	Black/African American
	Klaus	Industry	Male	S&E	Single	No	International	Asian
	Minjung	Industry	Female	S&E	Single	No	Domestic	White
	Sophia	Industry	Male	S&E	Single	No	International	Asian
	Velinda	Administrative	Male	SS&H	Married	No	Domestic	Black/African American
	Yuchan	Industry	Female	S&E	Single	No	International	Asian

Note. [a] RU faculty = Research university faculty, TU= Teaching university faculty, [b] S&E=sciences and engineering, SS&H= social sciences and humanities

Table 5.5

Brief Definitions of Each Phase of CASVE Cycle

CASVE Cycle	Brief Definition
Introduction	- A phase specifically designed for this study to understand how each interview participant of the study reflected on how she or he made her or his current primary career choice without being asking any CASVE cycle-related questions
Communication	- An individual becomes aware that she or he needs to make a career decision by receiving *internal cues* or *external cues*, which leads her or him to begin CASVE cycle. - An individual becomes aware a gap exists between where she or he is (current status) and where she or he wants to be (desired career status) regarding a career
Analysis	- An individual identifies her or his self-knowledge (e.g., values, interest, skills, employment preferences, and family situations) - She or he enhances her or his knowledge of options (e.g., occupations or fields of interest)
Synthesis	- By assessing her or his "personal characteristics in relation to the nature of a chosen career that she or he is considering, an individual identifies the level of incongruence and congruence of his or her career choices and oneself
Valuing	- An individual evaluates the potential costs and benefits caused by pursuing a primary career choice not only to herself or himself but also to her or his significant others - An individual identifies a direction by prioritizing the list of career options that she or he considers
Execution	- An individual develops an action plan, tries out the chosen paths, and commits to it to achieve his or her career choice
Communicaiton2	- After completing the Execution phase, an individual returns to this phase to examine whether the identified gap has been effectively diminished or removed
Metacognition	- Individual's cognitive factors (emotions) influencing the way she or he makes a career choice (can be negative or positive)

Introduction before the CASVE cycle. Without being asking any CASVE cycle-related questions, interview participants reflected on how they made their current primary career choices. The frequency of codes in this phase was calculated and presented in Table 5.6 and Figure 5.1. As indicated in Table 5.6 and Figure 5.1, participants' reflections on their career choice processes during this phase were mainly concentrated on the areas of communication and analysis phases, regardless of their career choices. The result of the independent sample *t*-test between the faculty and non-faculty career groups showed no significant differences: participants linger on reflections between the two groups in this phase.

Table 5.6

Frequency of Codes in Introduction by Groups

CASVE Cycle Phase	Faculty Career Group (n=15)	Non-Faculty Career Group (n=15)
Communication Phase	31	36
Analysis Phase	46	66
Synthesis Phase	9	10
Valuing Phase	6	3
Execution Phase	3	1
Metacognition	5	1
Other	1	0
Introduction Total	101	117

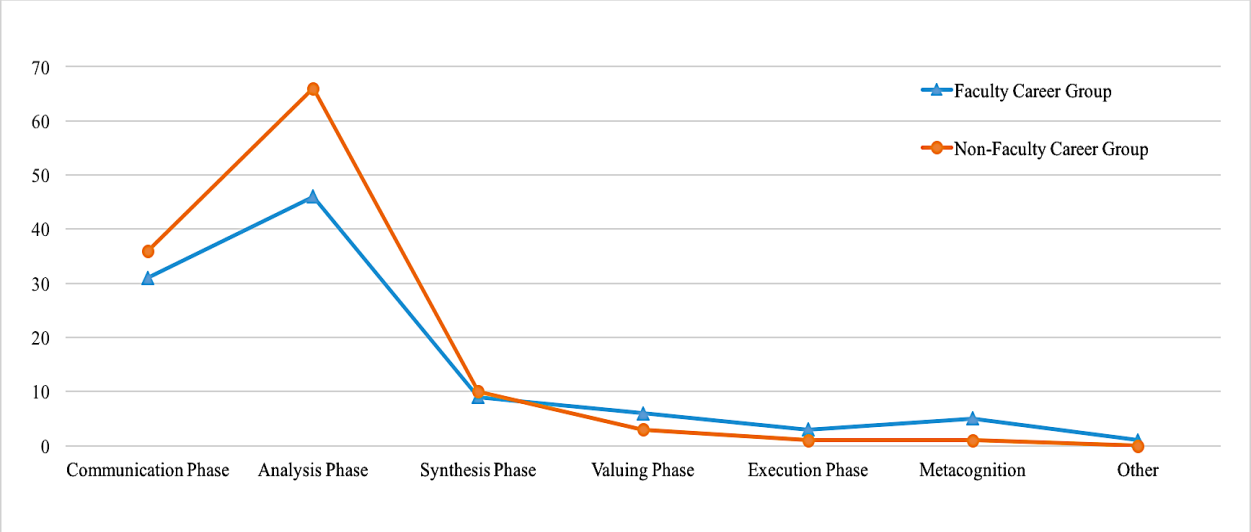

Figure 5.1. Code distribution patterns in the introduction by groups

Based on codes, patterns emerged from the analysis. Moreover, emergent themes in each group were individually examined to identify similarities and differences based on sought career paths. Similar to the code patterns presented earlier, the majority of emergent themes were connected with areas of communication and analysis phases. Indeed, these two phases were closely related, and they influence one another as participants described their decision-making processes without any guidance or prompting. The final themes that emerged from codes in the introduction were as follows: 1) first-hand experiences gained during the doctoral program functioned as external cues and sources to know oneself; 2) competitive current faculty job market, but different reactions; 3) influences of personal situation on career choices; 4) expressed interest in continuing research and 5) perceived congruence with self.

First-hand experiences gained during the doctoral program functioned as external cues and sources to know oneself. A majority of the interview participants, in the faculty career and non-faculty career groups, reported that their first-hand experiences gained during the doctoral program led them to consider their current career choices. Such experiences included

experiential learning—such as an internship, graduate assistantship outside of their department, teaching assistantship (TA), or research assistantship (RA); or, vicarious learning—such as observing faculty members in their department. That is, first-hand experiences during their doctoral training became a life event to help students to realize their potential career path pursuit after graduation.

Although participants in both groups expressed the importance of learning through experiences during their career-choice processes, the major types of learning they shared and how those experiences shifted their perspectives and potential career paths, were slightly varied by group. Specifically, many participants in the faculty career group stated that the experiential learning gained within their departments, such as teaching or research experiences, helped them to recognize their strengths and what they enjoyed doing, resulting in consideration to become a faculty member in either a teaching institution or research institution. For instance, Neo recalled how his research and teaching experiences guided him to consider pursuing a faculty career in a research university, which he did not think about as his option when he entered his program:

> I was strongly considering doing, just being a therapist, a psychologist, so just being a private practice therapist…I'd say probably even just one year, maybe even two years in, I really started understanding research better. When I first got here, I didn't really understand research. I didn't understand stats that well. I didn't understand what it was. But as I started working through the program, I started understanding what you can do with research, and I became obsessed with it...I wanted to be a researcher pretty early on here, and it's really sort of been confirmed over the last three or four years that research is more of my strength.

Similarly, Eli explained that all his employment experiences, including an internship outside of his program, teaching, and research experiences that he completed during his program, helped him realize what he enjoyed the most. These experiences resulted in connecting him with his future career path as a faculty at a teaching university:

> I did an internship in industry with a government contractor, and when I came -and I TA'd. I TA'd my first year that I did the internship, and then I came back and started on my research. And kind of having done all of them within a few months of each other, that really helped me think about, over the course of several months, how did I feel about doing research. How did I feel about being a TA? How did I feel about my internship? That's really what helped me realize that's the thing I enjoyed the most is that I had less bad days. I had less times when I did TA'ing than I did with the others.

Further, such experiences offered students opportunities to gain a better understanding of their interests or skills. Eli, for example, realized through his experiences that he enjoyed teaching the most. Meanwhile, Neo found that he was good at conducting research, which he did not realize when he joined his doctoral program.

First-hand experiences that participants in the faculty career group gained during the doctoral program encouraged them to aim for faculty career paths. In contrast, participants in the non-faculty career group reflected that their experiences during the doctoral program helped them to realize that becoming a faculty member might not necessarily be their only career option after graduation. The two major sources reported by this group were experiential learning through on- or off-campus employment. Their experiences included, for instance, administration and research project involvement, as well as vicarious learning experiences that involved observations of faculty lifestyles within their departments. For example, Ella reflected on her first job as a graduate mentor:

> While being in school, I have had the opportunity to work in some other roles, so I've worked as, like, a graduate mentor, which is kind of like an academic advisor. It started to make me think about other ways that you can work with students. So thinking about those other roles made me think about the possibility of doing those things long term. The experiences that I've had at other jobs made me think that that could be a good career path for me. Still in academia, but not necessarily teaching [as a faculty].

As described by Ella, working as a graduate mentor during her program helped her to recognize other career options. She could work with students in a capacity other than faculty

member. She considered the possibility of working in an administrative role in a university. Also, Jack stated that his decision to take a break from his doctoral program and to work as an administrator at a different institution provided him with opportunities to recognize "all of the other types of spaces of intervention in higher education that I could [be involved with]." He acknowledged this experience as a moment that "I sort of changed my mind because I realized I didn't just have to be a faculty member."

Similarly, Sophia shared that her research experience during her doctoral program inspired her to reconsider industry employment rather than working as a university faculty member. She realized that many research projects in her field took a great amount of time to complete. Sometimes the experiments failed, and it became necessary for her to repeat them. After these experiences, her career interest was changed and she started to think about going to work in an industry:

> I noticed that I didn't like projects to be too long. And oftentimes in -- like in faculty positions and in academic research, the projects are really long, and so I find that I get demotivated when I have to just sit there and wait for my results to happen or an equipment that has failed. I have to wait until it's back up again.

She stated, "I am more efficient when I am under pressure and when I am working in a more dynamic environment." Aligning with her research experience, she perceived that the doctoral program did not give her a specific deadline or specific set of goals, which also demotivated her in a certain sense:

> One main thing that I disliked very much about academic research and my Ph.D. is that you don't have a specific set of goals, so you're just like waiting around and, like, figuring out, oh, where do I go now? And I feel like I need to know what I am going to do to be able to work efficiently towards it and move on. I just don't want to stagnate. I feel it's not the type of work that makes me thrive.

Through her doctoral program experiences, such as working on her research projects and realizing particular milestones, Sophia noticed that the particular working environment and types of research were not what she wanted to pursue. By comparison, Minjung stated that the first time she seriously reexamined her initial career goal was after she started her program and observed the daily routines of faculty members and other researchers in her programs. She started to "find out that it [was] not what I thought. [I] perceived the job to be [what it was] not the same thing as like actual day-to-day." Through this experience, she realized not only that the faculty position might be not what she initially expected, but also the lifestyle was not necessarily one that she preferred to have as a profession after her doctoral program:

> I got to see actual the side of where the faculty sit and the researchers do for firsthand because I get to work with them as more of a peer versus like I was a student before. And so I get to know what they do day-to-day, what their job entails…I still like the broad concept of what they do, but I don't like the day-to-day tasks that I would have to do, and that's what really shifted for me.

Competitive current faculty job market, but different reactions. Participants from both groups were well aware of the current faculty job market as increasingly competitive. However, their reactions to such diminished job prospects for tenure track faculty positions were quite different by groups. The participants from the faculty career group accepted that it was certainly harder to acquire a faculty position and more competitive than before. Despite such difficult circumstances, they expressed that they still desired to pursue faculty career paths. For example, Victor emphasized that he was open to other career options in order to find a job because he realized that becoming a faculty is very competitive. However, it did not influence his decision to pursue a faculty career as his primary career path:

> Throughout my career, I realized that the competition is very high, so I thought I should increase my options, so I should be looking for some teaching positions, some non-research business job or like other research. It doesn't have to be tenure track position.

> I'm open to other research positions. I just wanted to increase my chance. But still my first preference didn't change.

Like Victor, Billy also acknowledged that "there are not very many faculty positions. Realistically, it is very competitive for faculty positions, and you might need to do a very long post-doc." However, he expressed an aim to pursue a faculty career path because of his particular interest in science. He said that "faculty at a research institution gives you the most freedom to do the science." A competitive job market did not prevent the participants in the faculty career group from pursuing faculty career paths.

By comparison, participants in the non-faculty career group responded to the external market situation differently. Learning that the current job market was very competitive functioned as an external cue that led some participants in the non-faculty career group to reevaluate their original career choice to become faculty. For example, Joshua started to reconsider his original career choice to become a faculty because "academia is way more competitive and there are just too many people who are in this, especially in biology." Ella also indicated:

> I was hoping when I started my program that the job market would be a little bit better by the time I got to starting to apply, but it doesn't necessarily seem like that's the case. It still seems very competitive, and if there's -- you know, it's not necessarily guaranteed that you'll get a teaching position right away.

Ella perceived the competitive job market for faculty as a sign for her to reassess the possibility of achieving a tenure-track faculty position. Although it was not the only reason for modifying their career choices, students indicated the external market situation as a reason that they started to doubt their future as a faculty member.

Influences of personal situation on career choices. This theme emerged from codes only from the participants in the non-faculty career group. In particular, it resulted only from female participants. The female participants in the non-faculty career group expressed that their personal situation related to family was one important reason why they began to reconsider their career choices. For instance, Velinda shared her personal situation:

> Before we got married, my boyfriend was also in academia and he had to go to Houston for a post doc. And then we just realized that we didn't want to do the whole, well, we're going to have to move, like, every year for I don't know how many years, and then we'll probably be separated because it happens to a lot of people. So we decided that the first thing was that we wanted to stay together.

As a result, Velinda started to reevaluate her original career choice because she wanted to stay with her husband and have a family. Further, she perceived that "it is really hard to have a family when you're in academia because there [are] so m[any] things that you have to do and publish so much and all that." Similarly, Ella wanted to return to the same location as where her husband was working. The desire, in her words, "limits my job search in terms of teaching positions." She knew that it may be necessary for her to "be willing to move anywhere" to become a faculty member, but that she was "not really willing in that way to move anywhere." Although Minjung was not married yet, she wanted to have a family around the time approaching her graduation. Her personal situation, wanting to have a family, made her reconsider her career direction from becoming a faculty member to industry employment:

> It is more feasible if I have a job where I can stay for ten years versus I need to look for a job every two years [for a postdoctoral fellowship], and I need to switch [to become a faculty].

Such personal situations, such as being with a family member, or planning to have a family, were not isolated factors that prompted participants to reevaluate their career plans.

Nevertheless, these situations were important external cues for considering non-faculty career paths. Their personal situations influenced these individuals to adjust their career goals in an effort to sustain and build their families.

Expressed interest in continuing research. Regardless of whether the interview participants pursued faculty career paths or non-faculty career paths, both participant groups expressed "continuing research" as a career-related interest. In particular, participants in the faculty career group, especially those who pursued a research-oriented university position, rather than a teaching-oriented university position, discussed their strong interests in performing research. For instance, Billy stated that practicing science was his long-term interest: "I went into science because I want to do science." Although Neo was not fully engaged with research before he joined his doctoral program, he articulated his growing interest in research: "[What] I really want to be doing is answering interesting questions about development over time and how it impacts my specific research interests."

Similarly, nearly half of the participants in the non-faculty career group expressed an interest to continue research. Notably, participants in the non-faculty career group recognized other career paths available where they could continue research in addition to a more traditional academic research setting (e.g., faculty member at a research university). For instance, Cam had "always been interested in research." During his doctoral training, he worked at different jobs outside his department. He worked at Student Affairs units and learned about "the different ways that educators and researchers can contribute to higher education outside the classroom." His understanding of possible career options prompted him to realize that an administrator role functions "as [a] way of being involved as a researcher." Also, Minjung emphasized that she could continue her research in industry because, according to a current job market trend in her

field, many companies had positions available for people with doctoral degrees: “I realize it [going industry] is actually much more interesting and a lot of times, you get to be in the lab…you get to do the research on the way you view it with money, essentially.” Likewise, Klaus decided to pursue a career in industry because he learned that it often offered more resources and technology than academia. Such advantages would support his particular continued research interests:

> Actually, it's because I am in the electrical engineering side, and especially we do more of the design part. The kind of work that we do, it's more mature, so there is not that much of work that you can do being a professor that you cannot do being in industry. More often than not because when we fabricate our chips, it's a very expensive process. So, you end up getting a better process access if you are actually in industry compared to in academia. They have more money and most of the things are confidential. They just don't ever give out. For example, if you go to A company, A would not give you the access to their fabrication technology ever. They would fund your research project and how to do it on your own, but you would not get the access to, like, new technology nodes and all those things.

Perceived congruence with self and career decision. As described, participants who decided to pursue faculty career paths were aware of the competitive faculty job market. Regardless, their consideration to become faculty members was not influenced primarily by current academic employment trends. In this introduction, some participants indicated a perceived congruence, identifying interests or skills that drive their career decision pursuits, rather than focusing on the availability of positions. Specifically, Marc decided to pursue a faculty career path because of his perceived alignment with his interest and skills that he identified during his doctoral program training. He said that “I feel like, with my interests and my talents, I think that I will not only be better able to get tenure as a teaching focused professor, but also I think I'll just enjoy it more.” Moreover, Chloe realized that her major interest in teaching arose from her teaching assistant experience. She believed that being a faculty member,

especially in a teaching-oriented university, would be "a good fit to be at a school where I was mostly mentoring undergraduates. But you're still […] able to keep your research going, but it's not as prioritized as […] mentoring and teaching." Finally, Billy pursued his faculty career path because of his interest and passion for science. This interest aligned with what a faculty in a research university generally does: "I went into science because I want to do science. And so faculty at a research institution gives you the most freedom to do the science."

During this introduction, participants in the non-faculty career groups also discussed their perceived congruence between themselves and their chosen career choices. While participants from the faculty career group were more concentrated on their interests or skills, the non-faculty career group participants focused on congruence with their personal situations or employment preferences. Some participants in the non-faculty career group, in particular, stated that they pursued non-faculty careers because of their preference to work in non-academic environments or because of current personal situations, such as marriage and other significant relationships. For example, Minjung decided to work in industry because her modified career choice was well aligned with her preferred working environment where she could build her family and continue her research without the pressure of securing research funding. Sophia also realized that working in an academic setting did not help her to work effectively because she needed more organized working environments, providing her with deadlines and sets of goals to structure her research moving forward:

> Like one week or two weeks before the deadline, I just, like, am very productive. And it's very satisfactory to me. It's very satisfying to feel like, oh, I did so much in so little time while, you know, a month ago I was, like, just sitting there and laying back and not knowing what I'm going to do.

Considering her perceived mismatch between preferred working environment and current doctoral program environment, Sophia reported that the current academic setting is "not the type of work that makes me thrive." Finally, Erland always wanted to work in industry because he could "be able to apply the knowledge and then [..] see […] your design being built in real life [as] a building or a dam or a road." Thus, he believed that industry employment provided him with an appropriate working environment where his tasks are "more practical, more applied" and "money [is] there."

Communication phase. During the communication phase, participants were asked to reflect on their current and desired career status. They were asked about moments when they realized that they wanted to pursue their current primary career choices (internal or external cues), as guided by the CIP theory. The frequency of codes in this phase was calculated and presented in Table 5.7 and Figure 5.2. Within the communication phase, participants' reflections were more concentrated on their current and desired career status than other areas, regardless of their career choices. Also, during the communication, more codes in metacognition emerged when compared with other phases. The result of the independent sample *t*-test showed no significant differences as participants linger in reflections between the two groups in this phase. Although the interview questions were related only to the communication phase, many codes that belonged to the analysis phase were identified (See Table 5.7).

Similar to the code patterns presented earlier, and the themes that emerged from the introduction, components of the communication phase were closely connected with those of the analysis phase. The final themes emerged from codes in the communication phase as follows: 1) different perceived current status between the groups; 2) metacognition, along with students'

perceived gap between current and desired status; and 3) perceived external cues, resulting from interactions with their environments.

Table 5.7

Frequency of Codes in the Communication Phase by Groups

CASVE Cycle Phase	Faculty Career Group (n=15)	Non-Faculty Career Group (n=15)
Communication Phase		
Current Status	39	33
Desired Career Status	30	24
External Cue	23	17
Internal Cue	9	4
Metacognition	15	9
Other	0	0
Analysis Phase	30	55
Synthesis Phase	1	3
Valuing Phase	1	0
Execution Phase	2	4
Communication 2 Phase	0	0
Communication Phase Total	126	130

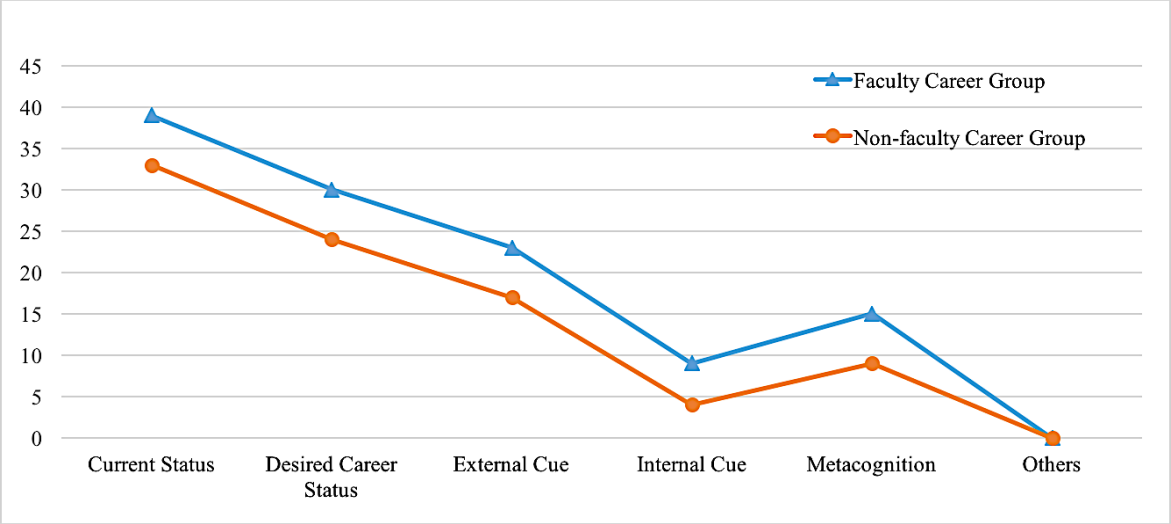

Figure 5.2. Code distribution patterns in the communication phase only by groups

Different perceived current status between the groups. The official statuses of participants in both groups of their doctoral program were the same—ABD doctoral students, what the interview participants reported as current statuses was slightly different. Over half of the interview participants in the faculty career group reported that they were in the process of applying for faculty positions, although they did not complete their dissertations yet. Some of them already received interviews. For instance, Soojin explained her current status:

> This month, I am starting to send my applications to schools, but I think I have done maybe 30%, so there are lots of schools that I need to apply. Then this weekend I had one Skype interview.

Although Soojin's primary career choice is to become a faculty member in a teaching-oriented university, she applied to both teaching and research universities to enhance her chances of being hired. Likewise, Ping, whose primary career choice was to become a faculty member at an R1 research university located in the Seattle area, reported that she was "mostly trying to open myself to much possibility. So I'm also applying to places like the East Coast and wherever there's [an] opening." This approach was mainly because she learned that "there are not that

many R1s that have a position opened that I could do." Eli also perceived "there aren't very many opportunities" to become a faculty member. Due to such lower job prospects, as a result of competitive job markets for faculty positions, some participants explained that they "play it safe" to enhance their possibilities to become faculty members.

Unlike the interview participants in the faculty career group, who were already on the job market, such job search activities were not actively discussed among the interview participants in the non-faculty career group. Over half of the participants in the non-faculty career group described their progress on their dissertations (e.g., Ella, Velinda, Erland, Jack, Grace), or research projects that they were currently working on (e.g., Klaus, Dorothy), as their perceived current status.

Metacognition along with students' perceived gap between current and desired status. When reflecting on their perceived gap between their current status and desired career status, some participants in both groups expressed beliefs regarding their current abilities to achieve their desired career goals. Five interview participants on the faculty career path exhibited relatively higher confidence in their experiences and abilities since beginning their doctoral programs, but they "feel less confident about entering into a faculty position," due to the competitive job market. Nia and Marc provided two examples of self-talk, showing mixed feelings toward their abilities and possibilities for achieving their chosen career paths. Nia was not sure whether what she had built for several years during the doctoral program was something that other universities sought from faculty candidates in her field:

> I think I have a great experience in terms of conducting research. I am fairly independent throughout my dissertation. I even, like, have good teaching experience, so I'm prepared that way too…I think I don't know if I am well equipped to--I don't know--have the best application or anything.

Similarly, Marc stated that "I feel confident that that part of my portfolio is strong." However, he was "cautiously optimistic" about his job search because "the job market is fickle, and it's competitive." Unlike Nia, Marc admitted that it was possible that he might not secure a job, considering the current job market situation. He expressed an alternative plan if his job search did not happen as he expected:

> If I'm not the best candidate, I wouldn't be surprised if I don't get offers this cycle. There are visiting professorships in the spring that I'll have to determine do I want one of those or do I want to just wait another year.

Recognizing the current faculty job search situation, and that it was harder to secure a faculty position, Marc considered alternative paths that ultimately connected with his primary career choice. The concept of *self-talk* in this context emphasizes concern for the self rather than external situations beyond one's control.

The majority of the faculty career group participants, who expressed their thoughts during this phase, were relatively positive that their skills and abilities were aligned with those of faculty. Non-faculty career group participants differed, however. For instance, Joshua was confident about his skills in his major, biology, but he was still uncertain about how his skills could be related to positions in industry. He stated that "I don't have a very good exposure with the industry [and] I have no idea what I am going to get." Such perceived lack of information on possible career options in the industry sector confused him as to how he could transform his skills and knowledge to match his sought career choice. Likewise, Dorothy was unsure whether she was competitive enough to find a job in the industry sector. Although her doctoral training helped her to be "prepared to be a very good research scientist," she was concerned about her competitiveness in the industry job market because she stated that "I'm unprepared for a job in industry." In contrast, through a career workshop that she attended, Brenda was aware that

building a network would help her to figure out how to achieve her desired career status based on her current status. However, her negative thoughts and anxiety seemed to prevent her from moving forward from her current status:

> I feel like you really need to do a lot of networking and in person, know a lot of people, and have people know you…but, I feel like we're just lowly grad students. Nobody cares about us yet…It's like you don't…that [where you want to work] is so unknown. I like to have a more direction.

Perceived external cues, resulting from interactions with their environments. Similar to the theme that emerged in the introduction, the majority of the interview participants in both groups in this phase indicated that experiences that they gained during the doctoral program became cues. These cues encouraged them to rethink their career choices or realize what they wanted for their career after graduation. Notably, the types of experiences that were reported as external cues were different by groups.

As for the faculty career group, nine participants reported experiential learning that they gained during their doctoral program as their external cues, helping them to realize which career path they wanted to pursue. Teaching experience and research experiences were the most commonly emergent types of experiential learning in this group. For instance, Soojin described that her positive first solo-teaching experience led her to think about becoming a faculty member at a teaching-oriented university:

> I taught classes last semester, and I really enjoyed it, and I got quite good student evaluation, so I think also that kind of helped me to consider a teaching institution and not just researcher in a research institution.

Likewise, Neo realized an event that shifted his career was "publishing my first paper." He was excited "about having your work as a first author out there for people to read and people were interested in it." Such first-hand experience from performing research to and publishing it,

"fueled my research interest," resulting in a pursuit to become a faculty member in a research-oriented university.

Although some participants, including Neo, identified certain events as cues, influencing their career choices, more interview participants indicated that their perceived cues were not a specific turning point or life event. Instead, their cues were rather, as one student put it, "a progression over time." Specifically, Chloe stated that "there was not […] a specific [turning] point" that made her decide to pursue a faculty career path. For her, the plan was more gradual and emerged through experiential learning, which she gained during her doctoral program:

> Every teaching experience that I have had has kind of helped reinforce that it's something that I like…I think that some of my research experience has been -- like my experience at going to conferences and things like that has been -- somewhat discouraging sort of like pursuing a research focus.

Throughout her program, Chloe's positive teaching experience and negative research experience promoted her career aspiration as a faculty member at a teaching university. Similarly, Ami stated that she was "slowly introduced to teaching. First, I TA'd under a professor. Now I teach my own course." She perceived such multiple teaching experiences throughout her program as a "gradual release of responsibilities," which helped her to understand that "this [teaching] is doable. I could enjoy doing this." Resulting from a "gradual takeover of responsibilities," she became aware that a faculty career path could be her primary career choice.

The reported sources of external cues from the participants in the non-faculty career group varied slightly from those in the faculty career group. For these students, vicarious learning and life changes, due to personal situations, were major sources. First, it was through indirect sources, such as hearing or observing, from faculty members or colleagues in their

department. Brenda reflected on the time when she listened about faculty members' academic lifestyles:

> I mean like my department head, she once recruited faculty from other universities to do like a Skype conference with all our grad students, and they were so discouraging. They were like, I teach four classes each semester. I had put in a lot of service as assistant professor, and I have to write grant proposals.

By learning about daily life as a faculty member from current faculty members, Brenda recognized many responsibilities that faculty members have and realized that "I don't want to work 100 hours a week." Likewise, Terry observed several faculty members in his department during his doctoral program and such vicarious learning functioned for him as an external cue to rethink his career choice:

> I began to experience, in the classroom as a doctoral student, what being a faculty member really looked like, right or wrong. But what I began to see was I don't want to do that. I don't want to go down that road.

In addition to faculty members, Minjung indicated that observing the career paths that doctoral colleagues pursued after graduation helped her to recognize what she wanted to pursue:

> I think it was more a gradual thing, more me learning more about actual real world jobs and just starting to see, like, some of my friends graduate or move on to their job, and just seeing their process made me realize what's for me and what's not.

Further, as discussed in the introduction, life changes, due to personal situations, emerged as external cues. Such cues prompted some participants, especially women, to redirect their career choices. The most often reported personal situation was related to family events. For instance, Hailey and Dorothy reflected on the moment they became mothers. Hailey stated "that was certainly a big part of it [turning point]" to made her decide to pursue a non-faculty career path. Likewise, Dorothy became a mother three months before an interview. During the

interview, she reflected that "I realized that I would like to have predictable work hours instead of working sort of 30 days in a row and then having a few extra days off. I'd like to keep a more standard schedule." Both described such life event that prompted them to move toward non-faculty careers, where they could work under a more standard schedule and spend more time with their family. Although Ella was not a mother, searching for jobs that were available where her husband and she lived became a turning point that made her rethink her career options:

> Moving to different place and I would say the move, my husband and I moving across the country was probably a life event that made me rethink about my options. I think if we had stayed here, maybe I would have been open to going to a job specifically, like applying to a job in California and then us move there. But because we've already made that move, I don't want to continue to move around the country a lot and continue to stay separated. So I think that was probably the bigger life change that made me rethink my career options.

Ella's personal situation prevented her from being flexible enough to move anywhere a faculty positon was available. As a result, Ella decided to pursue an administrative career in higher education.

Analysis phase. During the analysis phase, participants were asked to reflect on their perceived "self" (e.g., interest, skills, values, employment preferences, personal situations) and their career option knowledge, which was guided by the CIP theory. The frequency of codes in this phase was calculated and presented in Table 5.8 and Figure 5.3. Participants' reflections during this phase were concentrated on their option knowledge, interests, and employment preferences. Although the interview questions were related only to the analysis phase, some codes that belonged to the synthesis phase were identified (see Table 5.8). The result of the independent sample *t*-test showed no significant differences as participants linger in reflections between the two groups in this phase.

The final themes emerged from codes in the analysis phase as follows: 1) people as the most repeated option knowledge source; 2) different employment preferences: Flexibility versus work-life balance; and 3) dissimilar levels of perceived congruence with faculty careers by groups.

Table 5.8

Frequency of Codes in the Analysis Phase by Groups

CASVE Cycle Phase	Faculty Career Group (n=15)	Non-Faculty Career Group (n=15)
Analysis Phase		
Interest	70	86
Skill	44	46
Value	40	45
Employment Preference	54	50
Option Knowledge	104	94
Knowledge Source	46	50
Personal or Family Situation	52	43
Metacognition	8	4
Others	1	0
Communication Phase	3	5
Synthesis Phase	13	7
Valuing Phase	1	1
Execution Phase	5	4
Communication 2 Phase	0	0
Analysis Phase Total	366	367

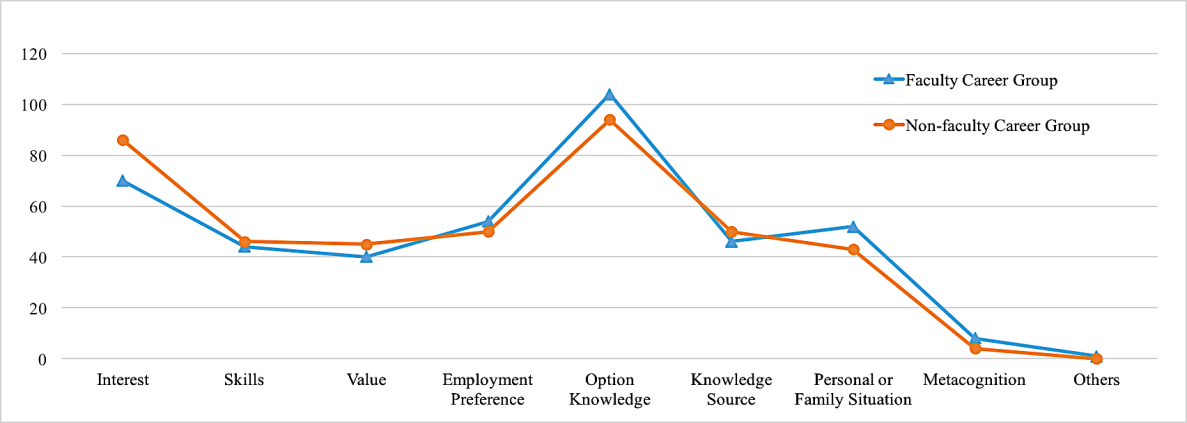

Figure 5.3. Code distribution patterns in the analysis phase only by groups

People as the most repeated option knowledge source. There were various sources to gain knowledge about career options, such as people, job postings, websites, books, graduate career offices, and students' own experiences. Among these options, people were the most frequently cited source of knowledge for career options, especially for the primary career choices of the majority of interview participants, regardless of group (n=27). However, types of people as the source were different by groups. Specifically, faculty members, including advisors, were the major source of participants, pursuing faculty career paths. By comparison, the major sources of option knowledge reported by those pursuing non-faculty career paths were professionals working in non-faculty fields, such as industry and administration.

Further, interview participants in the faculty career group noted that faculty members from their departments and others helped them to better understand career options, especially their primary career choices. Students' advisors were the most frequently reported faculty members. For example, Minhyuk referred to his second advisor who "has much experience in helping students to land the job market" as a key resource to guide his exploration of primary career choice. Comparatively, Kari gathered about knowledge of her primary career choice by observing her advisor: "He is starting his third year [as] faculty. I am seeing a lot of how life as

a young faculty is. So I get some idea." Also, Ami explained that she learned about a faculty career by closely working with her advisor for five years:

> My advisor who is also my chair, my dissertation committee chair, has been really helpful in thinking about, you know, what this will look like and has mentored me, I feel like, in all of my five years working with her in thinking about, you know, what's the day-to-day kind of life of a faculty member. So a lot of that has been through assistantships with her and also, like, the support she provides in the teaching that I do and all that kind of thing. So I feel like that's kind of where my – she is sort of my sounding board for thinking about what kind of place would be a good fit, what my priorities should be, and that kind of thing. I mean she is probably a pretty important person in thinking about where I want to apply and what makes sense to apply for and that sort of thing.

Through an apprenticeship with her advisor during the doctoral program, Ami gradually learned about the realities of a faculty position and made sense of that position in her own way. In addition to their advisors, some participants indicated faculty members outside their institution as sources of knowledge. Chloe, who wanted to become a faculty member at a teaching institution, consulted with "professors at liberal arts schools to find out a little bit more about what that's like." She found these connections particularly resourceful since it was limited for her to find concrete information on teaching-oriented universities through faculty at her own institutional affiliation, which was a research-oriented university. Also, Minhyuk used his own connections, reaching out to his friends who worked as "faculty members in other universities" to gain insights that were not readily available through other data sources:

> I have friends who are faculty members in other universities, and they are mostly Korean. And they provided me with some detailed, back stage story about how the hiring process goes. Through that, I learned some very good information about the job application and hiring.

Moreover, interview participants in the non-faculty career group indicated professionals working in the non-faculty fields as a major source to gain knowledge for their career options. For example, Velinda found her friends working in non-faculty career paths after graduating

from her program: “My friends have left academia to become high school teacher[s] or translator[s].” After talking to them, she knew that it could be “an option to me.” Likewise, Dorothy learned about the industry career options available from her “friend who recently got a job at a small pharmaceutical company.” Besides participants’ personal connections, other participants built professional connections through their own experiential learning, such as internship, on-campus employment (e.g., student affairs units), or projects with organizations outside the university. As Alfred stated:

> I know people in the professional world who I've worked with. We have really detailed information about basically how spacecraft operate, so one thing that I have been very lucky in getting, just through my connections with, the people who came before me is I do not just have the academic experience…One thing I've learned purely from the sort of maintained connections with me is specific knowledge about how things actually work... so I'm able to -- before I even leave now, tailor my work and research to incorporate that.

Through the long-term research project that Alfred worked on with a government unit, he was able to build a close relationship with professionals in that organization, helping him to understand “how things actually work.” Further, such first-hand experience helped several other participants—Klaus, Erland, Hailey, Jack, and Ella—to expand their option knowledge. In addition to “talk[ing] with other people as well who are in my field,” Klaus performed three internships in his doctoral program and knew “pretty much what is going on in the other side.” Through his own 12-months employment experience in another university as an administrator, Jack “began to see different administrative positions and how they function.” Similar to Jack, Ella spent her last summer vacation visiting archives for her research and recognized “doing research in an archive or a library or a museum as another possibility.”

Different employment preferences: Flexibility versus work-life balance. Between groups, there was a clear distinction in terms of employment preferences. The majority of the interview

participants in the faculty career paths (n=11) indicated workplace flexibility as an aspect of what they sought for their careers. Such workplace flexibility was divided into two parts: flexibility in work schedule and flexibility in accomplishing goals. Participants preferred to have flexibility as regards time management because they wanted to follow their own working styles rather than "being confined to certain hours of the day." Ping preferred to have "the ability to structure my own time" because she did not "function sometimes well on structured times." Instead, she preferred to "work well into the night, and that's just how I work." Similar to Ping, Fiona also sought flexible working hours because she wanted to schedule her work based on when she was more productive:

> I tend to do a lot of my creative work in the mornings, and like to meet with people in the afternoon or evening. So, I know that's a little bit hard because a lot of times in the afternoon or evenings I might not be in the office, and so my lab mates, that's when they are in the office, so I don't always see them. In my future job, I would want to establish that right away that I will be here in the morning working on something. Then if you want to meet with me, set up a time to meet in the afternoon because I don't like to be bothered in the morning because that's when I like to be in the lab or writing and things like that.

In addition to flexible work hours, some students sought flexibility to work as they wished. Billy specified this flexibility as follows:

> I don't want to do something where someone is telling me, "Push this button," and I push a button for however many hours I need to be there. I mean it is obviously not one button, but this push this button, this button, and this button in that order. That is not a job that I would want...Some freedom that I can approach a problem to solve it.

Although the degree of flexibility might be different based on his career, it is critical for Billy to have such "intellectual freedom" or "intellectual autonomy" that enables him to explore ways to solve problems "instead of being a button pusher." Although some participants in the non-faculty career group indicated flexibility to make one's own schedule (e.g., Alfred, Ella,

Sophia) as what they sought from their careers, over half of the non-faculty career participants (n=9) stated that a work-life balance, derived from a fixed work schedule, was the most critical element that they desired for their careers. Four participants, who were recently married or who had children, mentioned that having a standard working schedule was important in order to structure time to spend time with their families. For example, Velinda stated:

> I would like to be able to work within a defined, like, period of time, so that is why a 9:00 to 5:00 is appealing to me because I want to be able, especially when we have a family, I want to be able to, you know, be done with my workday and then focus on my family.

Velinda shared the impact of her marriage from the introduction, spending time with her family became more important, resulting in her ambition for a standard working schedule for her career. Likewise, Jack indicated that structured work hours "works best for our marriage even if they're long hours from like 8:00 in the morning until 6:00 at night." In this way, his wife can "develop expectations around that structure."

In addition to family reasons, others expressed desire to build a clear boundary between their work and personal life through a more structured working schedule. The idea was to "leave work behind at the end of the day." Minjung did mind long working hours because it was not that different from "the graduate school lifestyle." However, she emphasized the importance of keeping a distinction between work hours and personal hours:

> One thing I do seek once I do graduate is when I finish work and come home, I feel like I'm actually done with work and I can do home like this is my hour and I can do what I want.

Dissimilar levels of perceived congruence with faculty careers by groups. Although none of the interview participants were asked about perceived congruence with their sought career paths in the analysis phase, several participants in both groups voluntarily mentioned their

perceived fit between themselves and faculty careers. The perceived levels of congruence were distinctive by group. Specifically, the participants in the faculty career group perceived that their interest, employment preference, or personal situation was congruent with faculty position—including Ping, Victor, and Kari. In contrast, non-faculty career group participants expressed a lack of fit with faculty positions due to their employment preference and current academic job markets—including Hailey, Velinda, and Dorothy. Victor, in particular, indicated his interest in writing proposals and reflected on his perceived fit with his sought career path:

> I like writing proposals...I think that is why I also wanted to do be a professor because when I am writing proposals, I can always explore new things and sometimes I can try extreme points. And like you do not have to prove anything. You just need to offer some expected outcomes, et cetera.

Additionally, Victor did not like having a supervisor managing his work and preferred to be independent. Thus, he believed that he "will be the boss" of himself if he became a faculty because "you are pretty much more free" in academia. Similar to Vitctor, Kari wanted to have the freedom to do as she wished to accomplish her work. She thought, "as a faculty, I'm free." Further, Kari described her family situation and considered it to be an advantage to becoming a faculty: "I do not have my own family, plus I am single, so really the only responsibility I have is for me...that is good, especially for a faculty position [because] you do not know where to go."

Unlike Kari, who perceived her current family situation as a benefit for her career pursuit, other participants in the non-faculty career group, especially those who were married or who had children, indicated such family situations as a factor to influence incongruence with faculty positions—including Hailey and Velinda. As discussed, thinking of her employment preference enabled Velinda to reflect on how her changed family situations reshaped her employment preferences:

> What I would like is to find a balance between that and my personal life…being able to have some time off to go visit my mom or my husband's family…I mean I think that is why I am not fit for academia because I feel people in academia -- and maybe I am wrong, but that is like all the examples that I have seen is like people, like, are dedicated to their career. And that is not what matters to me. So, yeah, I do not think I would want something like a job that makes me put my family after my career.

Velinda realized that there was a lack of fit between what she sought in life and the faculty lifestyles that she learned about during the program. By comparison, Dorothy recently learned about the competitiveness of the current academic job market, which increased her perceived incongruence with a faculty career:

> I have also explored being a professor…That would definitely be interesting…It just seems like it is not possible. From what everyone has said, there is just so few jobs that I do not have very much hope.

As discussed in the introduction, such a competitive academic labor market might influence a student's decision to pursue a non-faculty career as one's primary career choice, regardless of any strong interest in academic research.

Synthesis phase. During the synthesis phase, participants were asked to reflect on their perceived congruence—the knowledge gained, as a result of self-assessment, and their career options from the analysis phase—with their primary career choices. The frequency of codes in this phase was presented in Table 5.9 and Figure 5.4. Participants' reflections during this phase were concentrated on their perceived fit with their sought career path. The result of the independent sample *t*-test showed there was a significant difference in the codes of congruence between the faculty (M= 2.47, SD= 1.41) and non-faculty career groups (M= 1.53, SD= 0.92); t (28) = 2.15, p = 0.04. This result suggested that there was a significant difference in their perceived congruence by their sought career choices. Specifically, doctoral candidates pursuing

faculty career paths were more likely to perceive higher levels of fit with their sought career choices than those who pursued non-faculty career paths.

The final themes emerged from codes in the synthesis phase were as follows: 1) the same environment, but dissimilar levels of perceived fit by group; 2) perceived congruence with interests and skills; 3) pursuing a career choice, despite incongruence with value; 4) perceived incongruence, due to a lack of knowledge on options; and, 5) changing a primary career choice.

Table 5.9

Frequency of Codes in the Synthesis Phase by Groups

CASVE Cycle Phase	Faculty Career Group (n=15)	Non-Faculty Career Group (n=15)
Synthesis Phase		
Congruence	37	23
Incongruence	27	32
Metacognition	1	2
Others	2	6
Communication Phase	1	2
Analysis Phase	2	9
Valuing Phase	0	0
Execution Phase	0	3
Communication 2 Phase	0	0
Synthesis Phase Total	66	76

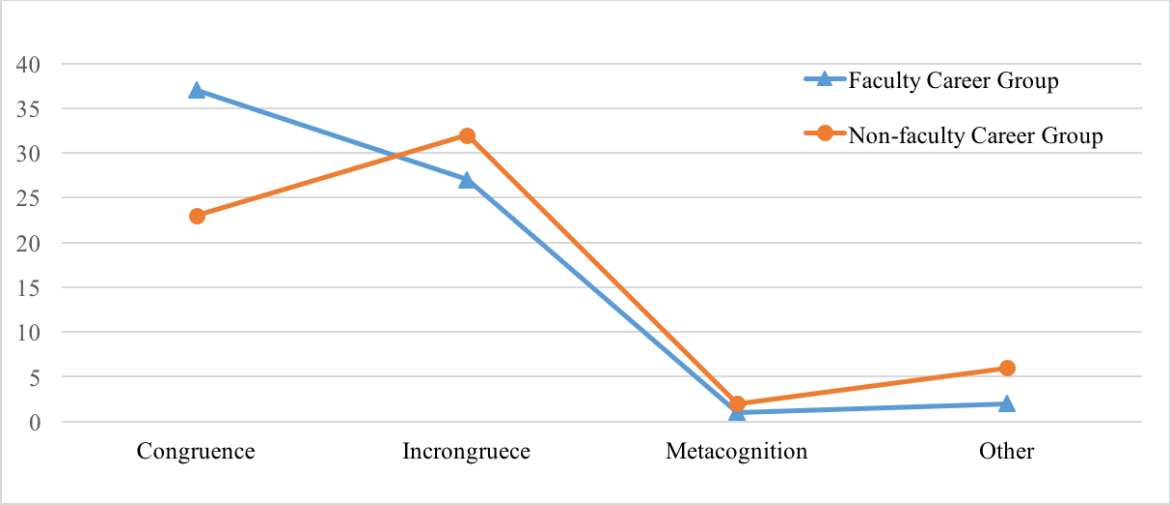

Figure 5.4. Code distribution patterns in the synthesis phase only by groups

The same environment but dissimilar levels of perceived fit by group. As discussed, faculty career group participants perceived that academic environments were well aligned with what they sought in their careers (employment preferences), based on the experiences gained during their doctoral programs. Specifically, over half of the participants in the faculty career group indicated that being in academia would provide them with flexibility in time management (e.g., Minhyuk, Troy, Ping), freedom to pursue their own research (e.g., Neo, Vitor, Kari, Fiona, Billy), and a less hierarchical working culture (e.g., Soojin, Kari). Besides such perceived congruence between their employment preference and expected academic environment as faculty members, Ping also explained that becoming a faculty member was a natural career choice for her because "that has been what I have been trained to do" during her doctoral program. Similar to Ping, Chloe appreciated her current academic environment because "I am in that environment all the time already and [it is] sort of more accessible" to what she cared about (e.g., teaching, interaction with students). Due to the perceived fit between her career choice and the academic

environment, she had "gradually lost interest" and "forgotten about them [career options that she considered before]."

Further, some participants (e.g., Neo, Soojin, Minhyuk) mentioned that a major reason to exclude other career options that they previously considered was due to the absence of particular working conditions, such as flexibility and freedom to pursue their research/science. For example, Neo explained why he excluded other non-academic careers that he had considered when he began his doctoral program as a therapist:

> I excluded the nonacademic track like a private practice therapist because I just simply do not want to live that life. That is the 9:00 to 5:00, every day of the year…It does have its freedom because you can pick and choose when you want to see clients, but I would not be engaged in scholarly research.

Neo could manage his working hours by choosing to meet his clients on a certain timeline. However, he believed that a non-academic workplace might not provide the freedom to pursue his ideas through research. Other opportunities might allow him to be surrounded with the type of people who "can sit in a conversation with somebody and generate ideas just all the time. And those ideas can start being molded into a project."

While participants pursuing faculty careers considered the academic environment as a great fit with their employment preferences, non-faculty career group participants identified environment as the most frequently identified reason to exclude faculty careers. As discussed, two non-faculty career participants desired to keep a boundary between work and life, but they felt that it might be not possible if they pursued faculty careers. Initially, Hailey considered becoming a faculty member in a research university, but her desire to have a job where she could balance her life and work was not aligned with what she had experienced during her doctoral program:

> I think it's mostly a work value thing. I think in a lot of way I would still enjoy that [being a faculty] …But, I think it's just mostly the amount of time you have to put in sort of beyond 9:00[am] to 5:00[pm]. I just do not know that I am interested in doing that [being a faculty]. The older I get, the more I do value sort of leaving work behind and having the flexibility to do other things.

After having her son, Hailey realized her work value "going home and not thinking about work." However, she could not leave work behind because she always felt "like I should have done more, I should be working on this, I should be doing that, and it is hard to relax when it is always hanging over your head." She did not think that it would be different if she became a faculty, and she did not want to be such working in such an environment after her doctorate degree. Similar to Hailey, Velinda perceived that if she became a faculty member, she would be "expected to answer emails or [my] personal life is less well defined," which was not congruent with what she sought in her career, which was regular working hours.

Several students (e.g., Joshua, Sophia, Klaus) mentioned that the academic research environment was not different from what they looked for from their working environments. As discussed, Klaus did not consider faculty career paths because of "a limited access to new technologies in academia." Sophia desired to work in a "dynamic environment," where she could have a variety of short projects. Based on her six years of training in her doctoral program, however, she learned that she could not have such environment in academia since many of the academic projects in her field required her to work in labs and invest in a longer period of time commitment.

Perceived congruence with interests and skills. The majority of the participants in both groups articulated a clear alignment between their interests or skills and their sought career paths. Soojin described the perceived congruence among her organization and information skills and her career goal: becoming a faculty member in a teaching university:

> I think it quite matches because I think that teachers should kind of organize things value add[ed], right? Otherwise, our class would be really messy. In terms of the organization, finding updated information would be nice also to that because then I can update my syllabus and update maybe current cases to my classes.

Through her teaching experiences, Soojin recognized how these skills were beneficial to her teaching. In contrast, Eli believed that there was overlap between his interest in teaching and learning through teaching and skills (e.g., good at working with students one-on-one) and "what I think a teaching professor does." However, he did not have a solo-teaching experience which made him "a little nervous about" his skills to deliver a lecture to a group. Similar to Eli, Kari enjoyed teaching, but "I don't know how good I am at teaching, so I would not necessarily put that in the strength category yet." Despite her lower confidence on teaching skills, she was very confident about her overall fit with her career choice: becoming a faculty in a research university. She believed the fit, considering her research and time management skills, as well as her interest in teaching, which would be "definitely advantageous for a faculty position."

Participants in the non-faculty career group also described their perceived match between their skills or interests and their sought careers. For example, Joshua, who decided to work in industry, reported his analytical skills as what many companies look for:

> I find that I am pretty good with the analytical part and I will not say, like, I have a very deep understanding of the things, but I have a very broad understanding kind of things. Those are more applicable for the industry part where you have a problem; you have to solve it.

Likewise, Jack described how his skills aligned with an administrative career path. Unlike Joshua, who directly connected the skills he developed during his program with what employers looked for, Jack transformed his teaching skills to leadership, communication, and people skills and described how these skills would be applied to an administrative position:

> One of the things about being an administrator is, in some ways, you are still a teacher. You are just a teacher of adults. You have a bunch of adults in a room that have to make a decision. What you have to do is help them find their way to the best decision…What is at the core of that is this sort of collective coming together to share our collecting of understanding of how we understand a situation and what we might see the possibilities to be.

If Jack could find opportunities to apply skills, such as a being an administrator, he thought it would "be a very good fit," even though he would not teach in the way he did in his doctoral program.

Pursuing a career choice despite the incongruence with values. It is interesting to note that one student in the non-faculty career group indicated a perceived incongruence with her values, but she still pursued her career choice because of congruence with other factors (e.g., skills, interest, employment preferences). Minjung was very confident that her skills, interests, and employment preferences would be perfectly aligned with what the industry looks for. However, Minjung struggled with her decision because one of her values might be compromised if she pursued her primary career choice, due to the current industry market situation:

> Value is something that I am more struggling with, and one thing I did want to do when I decided to go and part of the reason was I wanted to do something for environment, so I wanted to go into green energy. But right now it is a terrible time to get into green energy. So that is something I am having to compromise on. It is kind of sad to tell yourself that you are compromising on your value…But reality is reality, and it is not like in research it is any better. And my problem with environmental research is it ends up being just that research and nothing happens to it. I want to do something to happen as a result.

Although her value, making a green environment, might be compromised, she still wanted to pursue her career because she described that she could do more application if she works in an industry. Further, she thought that pursuing a faculty career to keep that value is "not really feasible if you are planning to have family, unless you are going to have a stay-at-home husband who will take care of everything for you."

Perceived incongruence due to a lack of knowledge on options. Seven participants (four from the non-faculty and three from the faculty career groups) mentioned that they did not focus on certain careers because they did not have any resources or information to understand these careers. For example, although Minhyuk was encouraged by his advisor to look for careers in industry besides academia, since his research was popular in the business sector, "I could not find [an] appropriate source of information or contact point to apply for the jobs." Both Velinda and Ella, who are pursuing administrative positions, did not considered non-profit organizations because "I do not know as much about those positions." This lack of information did not allow them to evaluate a potential fit: "I am not really sure even where I would be able to work."

Further, Cam excluded careers in the business sector despite a good fit with his employment preference: a better financial support, because he was not sure how to reframe his skills gained in academia. He said, "I do not think they articulate well how I could be useful or maybe I do not know how to articulate my skills about how to be useful."

Changing a primary career choice. Finally, one student in the non-faculty career group changed her primary career choice from going into industry to government work during the synthesis phase. Although this theme was only emerged from one participant, which was not aligned with the thematic analysis criteria discussed in Chapter 3, it was included because it was a strong evidence that supports the concept of synthesis phase of the CASVE cycle. When she was asked to reflect on the fit between herself and an industry career, Dorothy realized that working for the government would probably be the right track for her:

> I am realizing that a government job would probably be the right avenue for me just from talking. I think, now that I have thought about my values a little bit more and the specific reasons I don't want to be a faculty. I think maybe trying to get a job at a government agency is what I should be doing.

As described by Dorothy, exploring what she valued in the analysis phase, and having an opportunity to assess whether her value matched her sought career path, and other options, might enable her to recognize which career really matched who she was.

Valuing phase. During the valuing phase, participants were asked to reflect on the potential benefits and costs of pursuing their primary career choices. The frequency of codes in this phase was presented in Table 5.10 and Figure 5.5. Participants' reflections during this phase were concentrated on the benefits and costs as a result of pursuing their career choices. The result of the independent sample *t*-test showed no significant differences in where participants linger in reflections between the two groups in this phase.

Table 5.10

Frequency of Codes in the Valuing Phase by Groups

CASVE Cycle Phase	Faculty Career Group (n=15)	Non-Faculty Career Group (n=15)
Valuing Phase		
Benefits	36	30
Costs	32	24
Metacognition	0	2
Others	0	0
Communication Phase	1	0
Analysis Phase	8	5
Synthesis Phase	0	1
Execution Phase	0	0
Communication 2 Phase	0	0
Valuing Phase Total	66	76

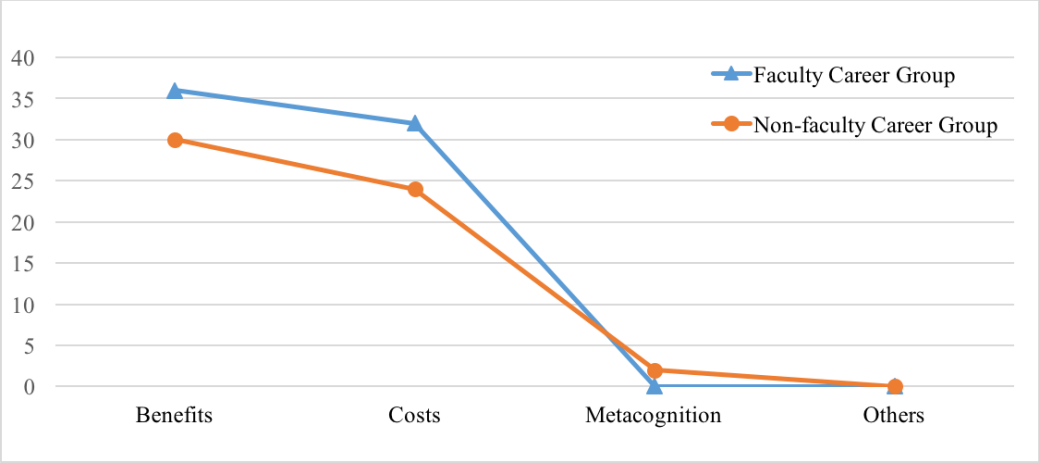

Figure 5.5. Code distribution patterns in the valuing phase only by groups

The final themes emerged from codes in the valuing phase as follows: 1) freedom to pursue one's interests; 2) stability and balance in one's life; and 3) potential financial gain. These three themes were the most frequently reported benefits or costs anticipated in pursuit of their career paths. Note that each theme that emerged from this study was reported as one group's benefit, but another group identified it as a cost.

Freedom to pursue one's interests. The majority of participants in the faculty career group reported "freedom" with their work if they become faculty members. Freedom was also identified by other terms, such as "liberty," "independence," "flexibility," or "autonomy" by the participants. Freedom was defined with slight differences based on the participants' major interests in their work. For example, Nia, whose major interest was performing research rather than teaching, defined freedom as being able to spend more time on research rather than teaching:

> The benefit will definitely be the fact that I will be able to do a lot of research with no amount of teaching or at least a very little amount of teaching, so that is definitely a benefit for me

Likewise, Ping, Minhyuk, and Billy reported autonomy to "be able to do the science" or to "keep working on my research interest" as expected benefits associated with their primary career choices. By comparison, Ami perceived the freedom that faculty would have as a capacity to act based on one's decision:

> I guess the benefit would be the ability to have more independence and freedom in my research and in my teaching, you know, because I think that this position gives me more power to make my own decisions and that kind of thing

Similar to Ami, Kari thought that freedom to decide where, when, and what to do based on her own schedule was the most important benefit that she would enjoy as a faculty member:

> What counts more for me is then the freedom that I can decide when to go home, whether I want to work from home maybe, when to travel, when to do things. I value that, that flexibility, that freedom higher than $50,000 more per year or so. That is definitely a benefit.

Although definitions of freedom varied slightly among participants, the main idea of freedom expressed was the ability to pursue what they care about and to accomplish those pursuits in the way of their own choosing. Note that some of participants were aware of career challenges to achieve their career goals, which are discussed in the following themes. Nevertheless, students believed that such challenges are "outweighed by that one cost because as a faculty member you have the freedom" as Neo described.

Nearly half of the non-faculty career participants also acknowledged the freedom that faculty members have in academia and indicated it as a potential cost of pursuing non-faculty career paths. In particular, the majority of students—Erland, Alfred, Dorothy, Grace, and Brenda—reported losing the freedom to continue research based on their interests as a major cost. For example, Erland mentioned that he was eager to return to industry, but he recognized that

doing academic research as he did during his doctoral program might be something that he would miss:

> But one of the things, and maybe it is research that I enjoy, so sometimes when you work in industry you have time to write papers because it is a business...Maybe that is one of the things I will miss. I will stop doing, but I still would love to do that. One thing I might give up is that research.

Unlike Erland, Brenda was looking for a research-related position in the government that might enable her to continue research. Significantly, she believed that she would lose the freedom to "research my most passionate research topics." Similarly, Alfred expected to have a lower level of freedom to research subjects of personal interested because "you don't have the freedom to research necessarily what you want at all times," compared with those who conduct research in academia.

Stability and balance in one's life. Approximately half of the participants in the non-faculty career group mentioned that the major benefits that they could find by pursuing non-faculty careers was having a more stable and balanced life. For Ella, it is beneficial to have a fixed working schedule, which enables her to "be able to go back home, so being able to then be with my husband." In addition to having time with family, Erland mentioned that having the weekends without work would be a big benefit that he could experience if he works for industry, which he had not had during his doctoral program:

> You have the weekends for yourself, whereas in academia sometimes it is not the case. I know professors take off the weekends, but the students, we keep working. That is one of the things I think I will not miss. It's also one other thing I will like about industry.

Similarly, Jack expected to have his own time more than before to enjoy his hobby if he works as an administrator:

> I can put a boundary up, so when I need to work on my book of poems, I can do it. I get up 5:00 in the morning and try to write between 5:30 and 7:30. I am able to do that because as an administrator I don't bring work home.

As discussed in the analysis phase, participants on the non-faculty career paths tended to have a stronger desire for their own time "apart from work" to balance their life and work. Note that such desire to pursue stability and to balance one's life emerged as the most frequently reported cost by the participants pursuing faculty careers. Considering the current competitive faculty job markets, four participants mentioned that they needed to take a risk and deal with uncertainty in their lives until they were finally hired as faculty members. For example, to increase the chance of becoming a faculty member, Chloe described the potential cost—uncertainty in her life—by saying that "you kind of have to be flexible and just willing to apply for all sorts of things and move to some place that you do not necessarily want to." Also, Troy indicated that he had to accept that it would be "a very unstable life" because he could not know where he would be living and how long it took for him to become a tenure-track faculty. Additionally, Troy was concerned about his unstable life and how it may impact his family life as well:

> It kind of hurts the family life. We want to have kids someday, but right now I am a student and my wife is kind of like she is an undergrad student now. She will also be a student probably, and so we really cannot do that right now because we will not know where we are.

Although Chloe was not married, she was also worried about whether she could balance her life, especially when she had her own family:

> We sort of have to be willing to not only subject yourself, but also if you have a family sort of like to make those decisions together. I ultimately want to have this type of career, but I don't know when that will happen…I think that that can be just very stressful and sort of be a negative impact on your everyday life.

Another group of participants—Ami, Nia, and Ping—reported a chance to lose balance in life due to high pressure from their work. Such pressure resulted from desire to earn tenure even after becoming professors. This was associated as another cost that would be caused by pursuing faculty careers. Ping described this cost, saying that "you have to subject yourself to higher standards. You have to publish more. You have to write more, right? So these are all I think costs." Similarly, Ami described cost as follows:

> The process of getting tenure being very tasking and time consuming, and sometimes I worry that it is going to feel like being in a doctoral program all over again...There is so much pressure to meet certain benchmarks and to be able to compile a certain kind of CV…Like I said, feeling like a repeat of graduate school because graduate school for me has been very, very stressful, and so I don't want to repeat that.

To Ami, going through a process similar to what she went through during her doctoral program could provide her with "an unhealthy kind of stress," which may prevent her from maintaining a psychologically healthy life.

Potential financial gain. The last commonly emerged theme from both groups was related to financial gain as a result of achieving their career paths. Many interview participants commented on their expected financial gain by pursuing their sought career paths. Half of the interview participants, regardless of group identification, mentioned that pursuing non-faculty careers, especially industry sectors, would have more financial benefits than pursuing faculty careers. Such potential financial gain was indicated as a benefit for those pursuing non-faculty careers, but it was identified as a cost for those pursuing faculty career paths. Note that the majority of the "cost" identifiers were students pursuing doctoral degrees in the field of sciences and engineering. With a major in civil engineering, Grace was confident that pursuing her career in industry "definitely does pay best of the three options I'm considering," in addition to the field experiences that she would gain. Minjung also indicated that earning a higher salary by still

doing “what I like, which is either being in the lab or analyzing data” as an advantage she would gain by pursuing a career in industry.

Also, the faculty career group participants expressed awareness that they might not be able to obtain as much financial gain as other doctoral recipients working in the non-faculty career fields, especially industry. For instance, through observation of friends in her field, Fiona knew exactly how much she could earn if she went into industry:

> Another cost I see is the actual cost. I know friends who have gone into industry and they make a lot more money. People who go into even like consulting, and they do not even do science any more, but their starting salary is like $250,000 without bonuses. And, I know that I am just as smart. I can do all of those things.

Although the financial loss of not pursuing an industry career was a potential cost to her, Fiona emphasized, “I do not want to do that [going to industry] because then I cannot do what I like to do.” Likewise, earning less was “not a big cost” to Marc because “that doesn't bother me particularly. I have fairly low needs in terms of money.” Instead, he cared more about whether he could do what he cares about: teaching and being in an intellectual environment surrounded by people with similar interests.

Execution phase. During the execution phase, participants were asked to share any plan that they would undertake in the near future to achieve their primary career choice. Also, they were asked to identify any current activities in this regard. The frequency of codes in this phase was presented in Table 5.11 and Figure 5.6. Participants’ reflections during this phase were concentrated on their action plan and activities they already implemented to achieve their primary career choices. The result of the independent sample *t*-test showed no significant differences in where participants linger in reflections between the two groups in this phase.

The final themes emerged from codes in the execution phase as follows: 1) collecting occupational information; and 2) gaining relevant experiences. Unlike the previous phases, this phase exhibited a clear distinction in the emerged patterns between groups rather than similarities.

Table 5.11

Frequency of Codes in the Execution Phase by Groups

CASVE Cycle Phase	Faculty Career Group (n=15)	Non-Faculty Career Group (n=15)
Execution Phase		
Action Plan to Achieve a Career Choice	36	30
Implemented Activities to Achieve a Career Choice	53	36
Metacognition	5	3
Others	0	0
Communication Phase	1	1
Analysis Phase	5	6
Synthesis Phase	0	0
Valuing Phase	0	0
Communication 2 Phase	0	0
Execution Phase Total	98	69

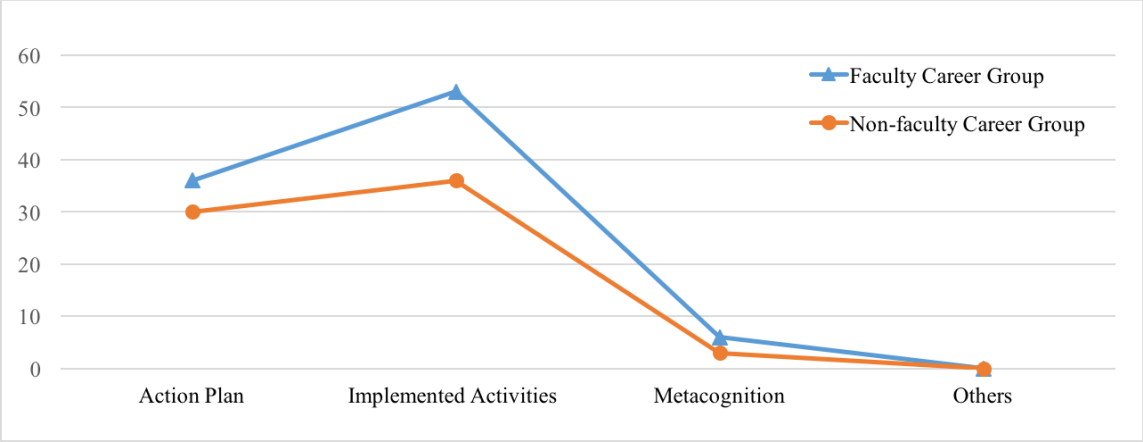

Figure 5.6. Code distribution patterns in the execution phase only by groups

Collecting occupational information. When the participants were asked to share any activities that they had implemented in order achieve their primary career choices, over half of the students in the non-faculty career group (n=9) reported that they had collected more information regarding their sought career paths, which was not identified from the faculty career group. The reported activities to collect occupational information were talking to people, especially those who were currently involved in the fields that the participants sought, looking at job openings advertised online, and using campus resources such as career service offices.

As similar to the theme in the analysis phase, people was reported as the most frequently source that the participants used in order to gain relevant information to non-faculty careers that the participants pursued. For instance, Yuchan used his own networks to seek information on careers related to industry and found that "the most helpful information came from my family, their friends, their connections offered me very practical advice…I have also got advice from my manager at my internship." Likewise, Minjung started to talk to her friends and expanded her information sources through the friends that she talked to: "I have talked to friends, friends of friends…like quite a bit of people" to get more specific information on possible careers in her

fields. In addition to seeking possible options in their sought career sectors, several participants (Jack, Hailey, Cam) reviewed actual job openings posted online to understand what currently available jobs looked like and identify required qualification as Jack described this as follows:

> I look at the job listings here at [my university]. Every week or every other week, I am on the university job board. Sometimes if I see a job that I might want to apply for, I look at it. I look at the qualifications.

After understanding the qualifications expected from a specific job that Jack was interested in, he reflected to measure the fit between his experiences and the qualifications:

> I think about how I can talk about my own experiences as a way to fit into these qualifications. So in a way I am always looking at jobs trying to arrange my experiences and abilities and whatever requirements to the job.

Such reflection helped him to better understand his position in the current job market and to identify which areas he might need to focus on to achieve his career choice: an administrator in higher education.

Lastly, two participants consulted campus resources to learn more about other options beyond faculty careers. It was difficult to find such information in her department, so Ella tried to "take advantage of campus resources that are available to help to learn more about what else I can do with my Ph.D." Although Ella did not specify the resources that she used to explore her career options, Brenda mentioned that she used a specific service, "the career exploration group," provided by the graduate career service office, to explore possible non-faculty career options.

Gaining relevant experiences. The majority of the faculty career group participants (n=12) described their scholarly experiences gained throughout their doctoral programs as they implemented activities for achieving their sought career paths. Their experiences included publishing research papers, teaching classes, writing grant proposals, and presenting their

research at conferences. Participants strategically gained these experiences with the purpose of becoming more competitive faculty candidates. For example, after he decided to pursue a faculty position at a research university, Neo “just spent the last four years building and building and building my CV.” Specifically, Neo said that he “set a goal for how many papers I wanted to have published by the time I leave." In addition to the quantity of his papers, he also intentionally sought research opportunities to work with people from different departments “to show interdisciplinary work.” Ping, who also pursued a faculty position in a research university, realized that she did not have enough teaching experiences. Prior to entering the job market, she exerted intentional efforts to find teaching opportunities inside and outside her department:

> I try to teach as much as I can, the community whenever I can, so I have a lot. I taught a lot in the community at libraries and stuff as, you know, as trying to boost up my teaching experience on my CV, so that is one of the things I did throughout my doctoral program

Similar to Ping, Minhyuk was designing and teaching a course in his department because he realized that a lack of teaching experience was a major drawback on the academic job market:

> I had no teaching experience at that time. So last year I was on the job market too, but it was a total failure because they say that, 'oh, you don't have any teaching experience, so we cannot consider your application.' ... Now, I am teaching a social media analytics course.

As such experiences were closely related to a doctoral program training that students often received, most of the participants in the faculty career group seemed aware of what kinds of skills and experiences were required to achieve their career goals of becoming faculty members. However, as discussed, most of the non-faculty career group participants focused on collecting information on possible non-faculty career options and the qualifications required to achieve such careers.

Communication2 phase. During the communication2 phase, participants were asked to share their emergent feelings with regard to their primary career choice along with particular activities mentioned in the execution phase. Additionally, students were asked to share their own criteria for a good career choice, based on their previous career decision-making experience, were also asked to share. The frequency of codes in this phase was presented in Table 5.12 and Figure 5.7. Participants' reflections during this phase were concentrated on cues to consider their choice as a good career choice and metacognitions. The result of the independent sample *t*-test showed no significant differences in where participants linger in reflections between the two groups in this phase.

Table 5.12

Frequency of Codes in the Communication2 Phase by Groups

CASVE Cycle Phase	Faculty Career Group (n=15)	Non-Faculty Career Group (n=15)
Communication2 Phase		
Clear Cues for a Good Career Choice	20	25
Unclear Cues for a Good Career Choice	4	2
Metacognition	23	27
Others	0	0
Communication Phase	2	2
Analysis Phase	4	5
Synthesis Phase	0	0
Valuing Phase	0	0
Execution Phase	0	1
Communication2 Phase Total	53	58

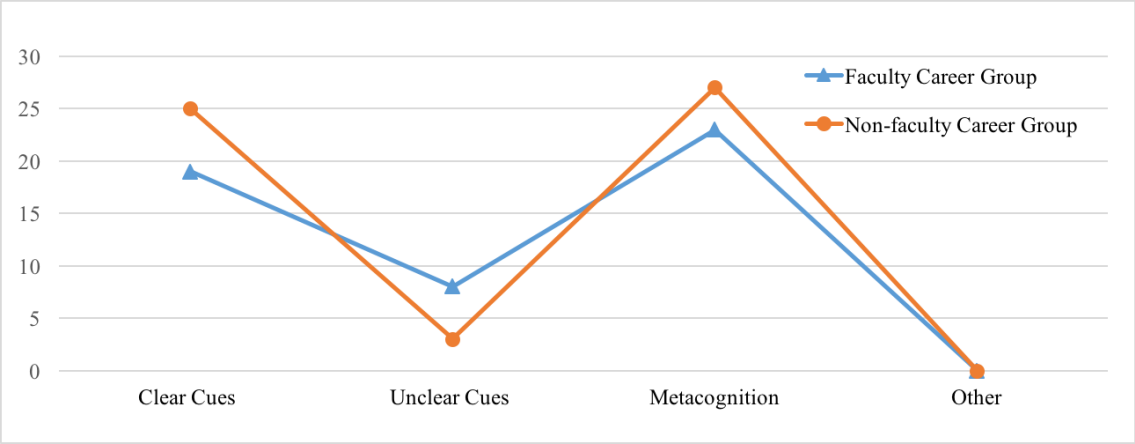

Figure 5.7. Code distribution patterns in the communication2 phase only by groups

The final themes derived from codes in the communication2 phase were as follows: 1) intrinsic factors as cues for a good career choice; and 2) a mix of excitement and anxiety for the next part of the process. These themes exhibited greater similarities than differences between faculty career and non-faculty career groups.

Intrinsic factors as cues for a good career choice. Three participants responded that they could not know whether their current career decisions were good because they had not yet realized the resulting lived experience of their choices. The remaining 27 participants, however, shared their own identifying cues for knowing whether they would make a good career choice. Although there were various ways to evaluate their chosen career choices, the majority of students considered intrinsic factors—improvement, contribution, and enjoyment with work— as indicators to evaluate whether they would be satisfied with their career choices. The most frequently reported intrinsic factors were contribution to community or society (e.g., Minhyuk, Billy, Nia) and self-improvement (e.g., Grace, Sophia, Yuchan). For instance, Nia described her cue for measuring whether her career choice would be a good one based on her previous work experience as a speech pathologist:

> I think it goes back to the fact that how my job impact[s] the world or impact[s] anybody for that matter. So as a speech pathologist at the end of the day if my patients came to me, they thanked me [and] they said, "you changed our lives. you did such a wonderful job," that was the job satisfaction that I got, and I loved it. I loved the fact that I was touching somebody's life. I was making some difference in somebody's life. So that matters a lot to me. So even here I am thinking that if I am doing the kind of research that I am doing, I know for sure that it is going to make a difference if not in the world, in somebody's life at least.

Moreover, Nia believed that it would be a great career choice if she could contribute to making a better world or making someone's life better through what she does. By comparison, for Billy, a good career is a job enabling him to "lead others to invent something where I will help invent something or discover something," which ultimately contributes to the scientific community.

Further, several students—Grace, Sophia, Yuchan—stated that self-improvement or growth would be signs of having made a good career choice. Sophia indicated that pursuing a doctoral degree was "a very good choice because it changed so many things in my life in a good way." In particular, she learned disciplinary knowledge and skills while also realizing "what I want and what I do not want." She believed that such self-improvement would be her criteria for evaluation. She recognized that industry work would be "a good choice" for her because it would provide a "dynamic environment" where she could continuously develop herself and apply what she has learned. Also, Grace reflected on her previous work experience in the field as an example for explaining how she would recognize that her career choice was a good one for her:

> I know things have been particularly good when I look back at it and I am like, that was a really good experience. Like I learned a lot from that. I feel like I gained more from it than I lost or that I was energized from it afterwards as opposed to exhausted. I think that that would make me feel like I made the right choice.

A mix of excitement and anxiety for the next part of the process. The majority of interviewees in both groups expressed their excitement and optimism for the next part of the process when they were asked to reflect on their current emotions about their primary career choice. For example, Klaus, who is pursuing a career in industry, expressed excitement and confidence about his career choice because "so far I haven't got any negative feedback yet, so it seems to be going in the right direction." Also, Minhyuk, who is seeking a faculty career, showed his optimism and confidence by saying that "I believe that I like this [my career choice], and I have capacities for [achieving] that…So, even if they are difficult, I think I can do them." However, several participants—Chloe, Ella, Ami—exhibited a certain level of anxiety while sharing their excitement for the next part. For example, Ella, who is pursuing an administrative career in higher education, felt that she was on the right track and felt excited for her next step. By comparison, she was concerned about the uncertain future. However, such mixed feelings, caused by positive and negative self-talk, were quickly replaced by her proactive attitude to achieve her career choice:

> I feel like I'm doing the right things…I think I feel good about it, and I think I feel eager. I think it is like I am happy about the choice that I made, and now I am like waiting for it to actually happen so that I can stop worrying about is it going to happen. That is why I am trying to utilize everything that's at my disposal right now in order to hopefully have a good end result.

Further, Ella expressed awareness of the impact of her negative thinking, which was caused by uncertainty about her future. She tried to manage her emotions by redirecting her focus on what she could do now to increase the possibility of achieving her career goal.

Chapter Summary

The following overarching research question guided the inquiries in this chapter:

- What are ABD students' internal cognitive processes, guided by CIP theory's CASVE cycle, for deciding to pursue a faculty or non-faculty career, respectively?
    - What similarities and differences are identified based on their sought career paths?
    - What are the factors that influence post-graduate career decision-making process to pursue faculty or non-faculty careers, respectively?

In order to answer the inquires, a total of 30 ABD doctoral students were recruited (15 for the faculty career group and 15 for the non-faculty career group). The structured individual interview protocol that was developed based on the CIP's CASVE decision-making cycle was used to interview the doctoral students to obtain an in-depth understanding of their cognitive process to make a career decision. Based on the directed content analysis (DCA), major themes of each phase were identified with graphs to show key construct distributions of each phase of the CASVE cycle. As Miles et al. (2014) emphasized, counting code distributions helped the researcher to recognize general data flow. This happened by examining code distributions, and it prevented bias. However, the emerged themes in the Synthesis phase were not clearly connected with the result of the independent sample *t*-test in the same phase. In other words, there was one theme emerged from the congruence. This theme presented the similarity between the groups rather than the difference, "perceived congruence with interests and skills." This qualitative finding is not aligned with the finding of the t-test, revealing a significant difference in their perceived congruence between the groups. Such contrary findings might be explained by the nature of the qualitative study. Frequency does not always relate to emergent themes from a qualitative research approach because it goes beyond "how much" to capture the reality (Creswell & Poth, 2017).

The summary of primary themes that emerged from each phase of the CASVE cycle was presented in Table 5.13. Particularly, it revealed similarities and differences in the career decision-making processes of doctoral students based on their sought career paths.

Table 5.13

Summary of Primary Themes Emerged from the CASVE cycle

Primary Themes in Each Phase	Group Similarity	Group Difference
Introduction		
• First-hand experiences gained during the doctoral program functioned as external cues and sources to know oneself	X	
• Competitive current faculty job market, but different reactions		X
• Influences of personal situation on career choices		X[a]
• Expressed interest in continuing research	X	
• Perceived congruence with self	X	
Communication Phase		
• Different perceived current status between the groups		X
• Metacognition, along with students' perceived gap between current and desired status	X	
• Perceived external cues, resulting from interactions with their environments	X	
Analysis Phase		
• People as the most repeated option knowledge source	X	
• Different employment preferences: Flexibility versus work-life balance		X
• Dissimilar levels of perceived congruence with faculty careers by groups		X

Table 5.13 (cont.)

Synthesis Phase		
• The same environment, but dissimilar levels of perceived fit by group		X
• Perceived congruence with interests and skills	X	
• Pursuing a career choice, despite incongruence with value		X[a]
• Perceived incongruence, due to a lack of knowledge on options		X[a]
• Changing a primary career choice		X[a]
Valuing Phase		
• Freedom to pursue one's interests		X
• Stability and balance in one's life		X
• Potential financial gain		X
Execution Phase		
• Collecting occupational information		X[a]
• Gaining relevant experiences		X[b]
Communication2 Phase		
• Intrinsic factors as cues for a good career choice	X	
• A mix of excitement and fear of the next step	X	

Note. X[a] = Theme emerged from non-faculty career group participants only, X[b] = Theme emerged from faculty career group participants only

The major emphasis of each phase in this section was to synthesize ideas derived from comparisons of doctoral students' career decision-making experiences based on their sought career paths, allowing to identify the following three key factors that may influence post-graduate career decision-making process to pursue faculty or non-faculty careers.

First, first-hand experiences during the doctoral program enabled doctoral students to understand themselves and their career options, resulting in realizing their potential career path

pursuit after graduation. Moreover, people serve a key function in increasing world knowledge that doctoral students draw from when making career decisions. Especially, insufficient option knowledge on their sought career paths prevent doctoral students pursuing non-faculty career paths from performing specific job search behaviors. Lastly, doctoral students' employment preferences influence their understanding regarding fit with their career options. Specifically, doctoral students pursuing non-faculty career paths preferred to have a balance between life and work while flexibility or freedom within their work was valued more by those who pursued faculty career paths. Note that employment preferences might change from personal life events, particular desire for family, marriage, and children and that this pattern emerged only from female doctoral students pursuing non-faculty career paths. Their reasoning was often because non-faculty careers would, in their view, be more conducive to maintaining work-life balance.

Chapter 6

Results of Mixed Data Analysis

The following overarching research question and sub-questions guided the mixed data analysis in this chapter:

- In what ways and to what extent do the findings of the quantitative data guided by SCCT and findings of the qualitative data guided by the CIP theory empirically converge and diverge to contribute to a comprehensive and nuanced understanding of the career decision-making processes of ABD doctoral students considering different career paths?
    - In what ways and to what extent do environmental barriers and supports, career-decision self-efficacy and career outcome expectations derived from SCCT relate to each phase of the CASVE cycle?
    - In what ways and to what extent do the identified patterns of environmental barriers and supports as well as self-efficacy and outcome expectations within the CASVE cycle explain the findings of the quantitative data guided by SCCT in this study?

This chapter presents the results of the mixed data analysis. First, this chapter presents findings that resulted by re-examining interview data, using a joint matrix, which was developed with four SCCT constructs. Based on the emerged themes, theoretical connections between SCCT and CIP theory are also discussed to answer the first sub-research question. Then, the findings from the joint matrix are used to answer the overarching third research question (including the second sub-research question) by comparing them with the findings of the quantitative data (survey data). It aims to identify overlaps and different facets between the two sets of findings.

Results of Interview Data Analysis through a SCCT Joint Matrix

Prior to answering the third research question, the qualitative data transformation process was conducted. The qualitative data, which was categorized into each phase of the CASVE cycle from previous qualitative research, were re-examined by using a joint matrix developed with four

SCCT constructs. The same coding procedure—directed content analysis (DCA), which was used to answer the second research question—was applied, but SCCT was used as a guiding theory. As discussed in Chapter 3, the inter-reliability between the two coders was also examined. Table 6.1 provides the inter-rater reliability results.

Table 6.1

RQ3: Inter-rater Reliability (Kappa) of Each Phase by Coding Round

Round	CASVE Decision-Making Cycle Phase						
	Intro	Communication	Analysis	Synthesis	Valuing	Execution	Communication2
1 [a]	–	–	–	–	–	–	–
2 [a]	–	–	–	–	–	–	–
3	1.00	0.60	0.63	1.00	1.00	1.00	1.00
4		1.00	1.00				

Note. [a] = During the analysis, the coders interacted with one another to make sense of the analysis process as well as to reach a consensus on the given definitions of coding guide. Thus, the inter-rater reliability was not examined.

The findings of DCA were presented in the joint matrix to identify the SCCT four construct distributions of each phase of the CASVE cycle. The frequency of codes in each phase of the CASVE cycle was presented in Table 6.2.

SCCT core constructs were concentrated on analysis phases, regardless of their career choices. The result of the independent sample *t*-test demonstrated that there was a significant difference in the codes of career barriers within the analysis phase between the faculty (M= 0.27, SD= 0.46) and non-faculty career groups (M= 0.87, SD=0.92); t (28) = -2.12, p = 0.03. This result suggested that there was a significant difference in their perceived career barriers during

analysis phase, according to sought career choices. Specifically, doctoral students, pursuing non-faculty career paths, were more likely to perceive career barriers during the analysis phase.

Table 6.2

Joint Matrix Arraying Numbers of Codes of SCCT Constructs in CASVE Cycle

CASVE Cycle	Career Group	Quantitative Themes: SCCT Core Constructs			
		Self-Efficacy	Outcome Expectations	Career Barriers	Environmental Supports
Intro	Faculty Career Group	7	2	7	4
	Non-Faculty Career Group	3	4	13	11
C	Faculty Career Group	16	5	6	5
	Non-Faculty Career Group	8	5	10	3
A	Faculty Career Group	36	2	4*	30
	Non-Faculty Career Group	29	2	13*	18
S	Faculty Career Group	5	6	4	4
	Non-Faculty Career Group	1	2	11	1
V	Faculty Career Group	1	1	4	1
	Non-Faculty Career Group	1	2	4	0
E	Faculty Career Group	2	6	2	14
	Non-Faculty Career Group	2	3	2	10
C2	Faculty Career Group	5	8	1	2
	Non-Faculty Career Group	3	8	5	4
Total		119	59	69	107

Note. * $p<0.05$ as a result of independent t-test between faculty and non-faculty career groups

Further, major themes identified from the analysis of codes from the joint matrix were also presented with verbatim responses, which are aligned with the themes. Primary patterns derived from comparisons of participants' experiences based on their sought career paths are discussed. As indicated in the method section, themes emerged from at least three participants of each group were selected to further examination. After careful examination, these themes were merged and reduced to a final theme list for each phase.

Introduction before the CASVE cycle. In this phase, primary themes were derived from career barriers, environmental supports, and self-efficacy. The final themes that emerged from codes in this phase were as follows: 1) competitive current faculty job market was perceived as a career barrier; 2) expressed confidence in abilities to perform faculty career-related tasks, and 3) different sources of environmental support by group. To connect the interview data that was analyzed based on the CIP theory, external cues, which were derived from first-hand experiences from the communication phase, as well as occupational knowledge on sought career paths and skills from the analysis phase, were the major sources of these three SCCT constructs.

Competitive current faculty job market was perceived as a career barrier. Regardless of sought career paths, participants were concerned about the increased competition of faculty career paths. Participants, pursuing faculty careers (e.g., Troy, Victor, Billy), were aware that "there aren't very many faculty positions," and they expected to become "very competitive" to achieve their career goals. For instance, as graduation approached, Troy realized that "it [a faculty position] is way more competitive than I thought." Similarly, several participants in the non-faculty career group, who previously considered faculty career paths, (e.g., Dorothy, Ella, Joshua), indicated the competitive faculty job market as a career barrier that they perceived.

Dorothy expressed that the current academic job market situation was one major reason that led her to realize that career progress toward a faculty career path would be difficult. She said:

> I made [government as] my primary choice just by looking at what options appear to be available and reading articles about the lack of jobs in academia and realizing that it just might not be feasible to get a job in academia.

As described by Dorothy, such conditions became a career barrier for her, resulting in her consideration of non-faculty careers.

Expressed confidence in abilities to perform faculty career-related tasks. Nearly half of the participants in the faculty career group exhibited a strong confidence in their abilities to teach classes or conduct research. Such high levels of self-efficacy, regarding the tasks related to faculty careers, which was expressed by participants, suggested that their perceived career barrier—the competitive current faculty job market—was not impenetrable. Instead, they rendered it as a challenge to overcome. For example, Fiona expressed high levels of self-efficacy in various tasks related to teaching and research based on her previous successful experience during her doctoral program:

> I think it's a lot of what I've done during graduate school has prepared me for that job, not just doing research, but mentoring other students, writing grants, writing papers, presenting. I've been pretty successful at all aspects of that, so I felt more confident about it. And now I feel like I would be good at that job, and so that's why I chose it.

Such previous successful performance strengthened her belief about achieving her career goal: becoming a faculty member in a research university despite the competitive current faculty job markets. Likewise, Marc believed that his talents in teaching and several successful teaching assistant experiences would enable him to "be better able to get tenure as a teaching focused professor."

Different sources of environmental support by group. Five participants, pursuing faculty career paths, revealed positive perceptions of their doctoral training environments. Specifically, they perceived that their doctoral program helped them to prepared for their career goals by receiving opportunities to build teaching or research skills (e.g., Ami, Fiona). Also, it provided them with access to relevant career information from faculty members in their fields (e.g., Nia, Soojin). As discussed, such settings operated as an environmental support, fostering scholarly self-confidence in doctoral students pursuing the faculty career paths. However, the same academic environment functioned quite differently for several participants in the non-faculty career group (e.g., Brenda, Cam, Hailey, Velinda,). During their doctoral program, the non-faculty career group participants realized that the current academic environment or the lifestyle of faculty that they observed or experienced might be not what they want to have for their careers. For example, the lack of a clearly delineated work-personal life boundary, which Hailey experienced during her current doctoral program, redirected her to shift career choices from faculty to administrative careers:

> I know that I don't want to continue doing what I'm doing right now, which is working all day and then doing my research at night. And I would be worried that a tenure track faculty is the same, and I don't want to do that. So I am very strongly considering moving more like an administrative path.

Moreover, Hailey was overwhelmed by the volume of work assigned to her as a doctoral student, which constructed a career barrier to her interest of a faculty career path. Similar to Hailey, Velinda also recognized that academic careers might not allow her to have a family, based on her observation of faculty lifestyles in her department:

> It is really hard to get a family or to have a family when you're in academia because it is like your job or your family because there are so much things that you have to do and publish so much and all that.

Instead of their affiliated departments, participants in the non-faculty career group often found the on- or off- campus employment experiences outside of their departments as sources to facilitate their career progress. As a result of such direct involvement during their doctoral training, several doctoral students (e.g., Cam, Ella, Jack) recognized that there were various career paths available to them beyond a faculty career. For example, Cam considered his involvement with Student Affairs units as events that had the effect of facilitating career progress: "I was working different jobs during my time here as well, such as the Office of Minority Student Affairs. I begin to see those outlets as ways of being involved as a researcher." Cam found other "outlets" to employ the skills that he developed during the doctoral program (e.g., research skills) in addition to a faculty career path as a result of engaging the environmental support offered by his employment experiences in Student Affairs.

Communication phase. In this phase, primary themes were also derived from career barriers and self-efficacy. The final themes that emerged from codes in this phase were as follows: 1) a personal situation functioned as a career barrier limiting career options, and 2) expressed lower levels of confidence in securing a job, but for different reasons. In connection with the interview data, which was analyzed based on the CIP theory, external cues from the communication phase, personal or family situation from the analysis phase, and metacognitions were the major sources of these two SCCT constructs.

A personal situation functioned as a career barrier limiting career options. Four female participants in the non-faculty career group perceived that their personal situations, especially family-related life events, limited the number of career options available to them. For example, Dorothy recently had a child, which restricted her career options after graduation:

> I had a baby about three months ago. A year ago, we decided to start trying for a baby and I realized that I would like to have predictable work hours instead of working sort of

> 30 days in a row and then having a few extra days off. I'd like to keep a more standard schedule. And so moving out of animal research would be good for that.

As described by Dorothy, she decided to exclude several career options to avoid potential conflicts between family and career demands. Specifically, she excluded a faculty career path even though it was her initial goal when she started her program because she believed that she could not maintain a boundary between work and personal life if she pursued that career. Further, she might have limited options even in her sought career path—industry—because she did not wish to find a job that was related to animal research to avoid a possible negative influence on her baby. By comparison, Minjung, engaged to be married, reported that finding a place where she and her fiancé could stay together made her job search process more "complicated."

Lastly, Sophia, a participant pursuing a career in industry, expressed concern caused by her visa situation. Unlike other international doctoral students in the field of science and engineering, Sophia found that companies related to her major, bioengineering, were reluctant to hire her due to her employment visa situation, despite a perceived fit between her skills and job requirements:

> International students in electrical engineering and mechanical engineering and computer science, they have no issues applying to companies. In my case, because I'm a bioengineering background probably, I feel that when I apply to positions people are interested in my profile and I get contacted, and I get the interviews with the managers. But then when I talk to the HR recruiter, then they ask me about my work authorization and the tone changes, and then I get rejected.

Sophia's unique personal situation, which was related to her major and citizenship status, became a career barrier for her to pursue what she wanted to do "because it means that I will not be able to choose the best option for my career. I will just have to take whatever comes my way."

Note that solely the non-faculty career participants reported perceived career barriers caused by personal situations of this kind.

Expressed lower levels of confidence in securing a job, but for different reasons. Several participants in the groups exhibited lower levels of confidence in accomplishing their sought career goals. However, the reasons for such low self-efficacy were quite different by groups. Although the participants from the faculty career group (e.g., Eli, Nia, Neo) were confident of their abilities to perform scholarly tasks, such as teaching and research, the current competitive tenure-track faculty job market decreased their confidence in achieving their career goals. For example, Nia was not sure about whether she could secure a faculty track, despite her skills in teaching and conducting research. She stated:

> I think I have a great experience in terms of conducting research. I think I can run a lab if I end up getting my own lab and getting a team. So I'm confident that way. I even have good teaching experience, so I'm prepared that way too…But, I am not as confident [when it comes to job application] …I think I don't know if I am well equipped to have the best application or anything.

Similar to Nia, Eli was confident that he could teach successfully, if he becomes a faculty member at a teaching university, but stated that he is "less confident of getting the job I want. And particularly that I think that what I want is… there aren't very many opportunities." As discussed in the introduction, the interview participants in the faculty career group perceived such a competitive job market as a career barrier, decreasing students' beliefs in achieving their chosen career goals, even though they were confident that they acquired the necessary experience and skills to become faculty members.

Non-faculty career group participants differed, however. Several participants in the non-faculty career group expressed lower levels of confidence in achieving their career goals, due to a lack of information on non-faculty careers. Dorothy said, "I'm unprepared for a job in industry"

because “I don't have business training, so it would just depend on what my skills can be applied to.” Dorothy was not sure how her research skills, which were gained through her doctoral training, could be applied to industry positions, undermining her confidence. Moreover, Brenda, who was interested in working for the government, expressed a lack of confidence in a possibility of securing a government job because she did not have network connections with the government sector: “I just don't know many people in government. so this is very difficult to obtain, this kind of insider information.... That's so unknown. I like to have a more direction.” Likewise, Joshua expressed uncertainty about whether he could find a job in industry since “I don't have a very good exposure with the industry.” Discussions with these non-faculty career participants revealed that a lack of exposure to their chosen career paths (e.g., what options were available, what kinds of skills were required, how to get such information) made them feel unprepared, resulting in reduced self-confidence about their abilities to achieve their sought career paths.

Analysis phase. In this phase, primary themes were derived from career barriers, environmental support, and self-efficacy. The final themes that emerged from codes in this phase were as follows: 1) dissimilar views on doctoral training environments: (a) for career supports, and (b) for career barriers; 2) built one’s support systems through personal connections; and 3) equally expressed confidence in one’s abilities to perform scholarly tasks. Connected to the interview data that was analyzed and based on CIP theory, skills and occupational knowledge from the analysis phase were the major sources of these three SCCT constructs.

Dissimilar views on doctoral training environments: (a) for career supports, and (b) for career barriers. Discussions with the interview participants revealed that doctoral students in this study perceived their doctoral environment (e.g., department climate, support form faculty)

differently based on their sought career paths (faculty versus non-faculty career paths). Over half of the participants in the faculty career group indicated the following factors as career support systems: faculty members in their programs, seminars offered by their departments, and peers pursuing the same goals in their departments. These systems help participants to obtain opportunities to enhance skills (e.g., Ami, Kari, Marc, Neo) as well as to gain knowledge of faculty careers through information about application processes and tips (e.g., Fiona, Troy, Kari), general responsibilities and expectations for faculty members (e.g., Ami, Fiona), and qualities required to become competitive in faculty job markets (e.g., Soojin, Minhyuk, Ting). For instance, Fiona described various programs offered by her department that she attended during her program:

> I attended an academic training program over the course of a semester, so we basically went through the process of how to apply for faculty positions, so all the essays and everything like that. We worked on that together, which is nice. It was really good at covering the application process… My department has a lot of ways where you can meet with seminar speakers or meet with new faculty members, have breakfast with them, have coffee with them... In those kinds of formal, but informal interactions, I've learned a lot about what faculty actually do, both when they're really junior and also up to, like, very senior folks, department heads, things like that.

Having a positive experience with her department as an environmental support led Fiona to gain knowledge on the faculty job search process and a faculty career more generally. As discussed in Chapter 5, by closely working with her advisor as a mentor and supervisor from the beginning of her doctoral training, Ami learned about "what's the day-to-day kind of life of a faculty member." Gradually, her positive relationship with her advisor led her to consider her advisor as a role model who was "a pretty important person in thinking about where I want to apply and what makes sense to apply for and that sort of thing." In addition to support from departments, Marc reported interactions with his peers, who shared similar career interests in his

department, as important environmental supports that reinforced his desire to pursue his career. He reported, “meeting with other graduate students and talking about things like that we study, things like common problems we run into.”

The faculty career group participants gained in-depth knowledge on faculty careers and positive encouragement to pursue faculty career paths from their departments. In contrast, nearly half of the interview participants in the non-faculty career group perceived that their current environment did not provide sufficient support for them to prepare for their sought career paths. Ella felt that she did not receive proper career education from her department to enable her to expand her career possibilities. She found her options limited to faculty career paths:

> I don't feel like we are trained to think about other things outside of faculty positions. I feel a little bit inexperienced in terms of or uneducated in terms of the various things that you can do with a degree like this.

Similar to Ella, due to a lack of career guidance, Minjung struggled with her first job search because “it's really hard to get any information about what it is, what jobs are available or even what companies I should be applying for…. it's a very confusing process.”

Moreover, two participants mentioned that they felt that their departments did not consider pursuing non-faculty career paths as desired career choices for doctoral recipients. Through his doctoral experience, Cam felt that the atmosphere in his program seemed “very concerning where the only talk of a career is faculty” and considered “people who don't become a faculty member some type of failure.” Unlike Cam, who received these unwritten or unspoken impressions during his study, Jack shared a discussion that he had with his advisor, regarding career options after graduation. He received negative feedback from his advisor: “Certainly my faculty advisors were only talking about research one institutions. And they considered working as an administrator a failure, and that's what it is.”

Built one's own support systems through personal connections. Instead of relying on their departments, over half of the non-faculty career group participants used their own personal connections. They built these connections during their doctoral program to gain career supports. Such systems include, for example, professionals working in non-faculty fields (e.g., Cam, Grace, Klaus, Minjung, Alfred), family members (e.g., Velinda, Yuchan), or peers with similar career interests (e.g., Erland). Among these, professionals in the field were the most frequently reported environmental support. For instance, Grace built her own professional network with professions working in industry by participating in a professional organization in her field:

> I have a lot of information about which companies exist and what they do in my field. And part of that is because I'm part of a professional organization for railroad engineers, and we get to go to the national conference for that every year pretty much...They have a career fair at that conference every year specifically aimed at students who haven't entered the industry yet, which is really nice.

As described by Grace, her active involvement with a professional organization offered opportunities to explore other career options with people who had similar career interests. Moreover, through his Student Affairs employment experience, Cam gained occupational knowledge of his career path, as he served an administrative role. Further, he received practical advice by "talking to some of my bosses or my current employer about what are some good options for my career based on who I am." In addition to professional relationships, Velinda identified her husband, who also sought a similar career path, as her environment support, who helped her to explore an administrative career further:

> It's mainly through my husband because he had a position at the library last year, and he got to work with a woman who is, I think, gone now. But I don't know if she really started it or worked with a career center for the graduate college. And so he met with her several times, and so he would tell me because he's seeking the same kind of a position.

Equally expressed confidence in one's abilities to perform scholarly tasks. Regardless of their sought career paths, the majority of the interview participants expressed strong confidence in conducting scholarly tasks, such as conducting research, teaching, or managing research group members. For instance, Minhyuk, who is pursuing a faculty career in a research university, expressed his confidence in conducting research based on his high number of publications and conference presentations, which he accomplished in the five years of his doctoral program. Dorothy, who is seeking a career in industry, was also confident about her data analysis skills to conduct research:

> I'm pretty good at data analysis and acquisition. I tend to be really good at making things faster, so finding better ways to analyze data in order to speed up the process and that kind of thing, and looking at things flexibly from different perspectives.

Another participant from the non-faculty career group, Velinda, shared her confidence in abilities to teach and mentor students because she "usually ha[s] good evaluations." Similarly, Chloe, who is considering a faculty career at a teaching university, was confident about her communicating her thoughts and "figuring out how to explain things, either in teaching or in presenting my research." As described by the abovementioned doctoral students, the interview participants from both groups in this study expressed confidence about conducting tasks that are closely related to traditional doctoral training, such as conducting scholarly research, analyzing data, teaching students, and presenting research.

Synthesis phase. In this phase, primary themes were derived from career barriers and outcome expectations. The final themes that emerged from codes in this phase were as follows: 1) citizenship status as an influential factor during the career exploration stage, and 2) positive career outcome expectations based on previous academic achievement. Connected to the

interview data, which was analyzed based on a CIP theory, the perceived congruence and incongruence from the synthesis phase were the major sources of these two SCCT constructs.

Citizenship status as an influential factor during the career exploration stage. As discussed in the communication phase, the impact of personal situation caused by citizenship status (international student status) was discussed by both faculty and non-faculty career group participants as a perceived career barrier. In the communication phase, Sophia identified her international student status as a career barrier, hindering her current job search in industry, by limiting the number of companies that she would be eligible to join. However, in this phase, several doctoral students reported their international student status as a previous career barrier when they explored possible career options prior to determining their current sought career paths.

When doctoral students were asked to describe the reasons for excluding their previous career options in this synthesis phase, three participants, who are international students—Minjung, Nia, and Soojin—mentioned that they had to exclude certain career options, due to their citizenship status, regardless of their career interests. Although Nia previously considered working for non-profit organizations in addition to becoming a faculty member, she excluded this career option because "they will not be able to fund you for a visa. That's one of my primary reasons. I cannot apply for it right now." Likewise, Minjung, who is pursuing a career in industry, was also interested in working as a researcher for a research institution. However, she found that her citizenship status might reduce the possibility of securing a job at a research institution, regardless of her interests or skills to conduct research, due to the nature of work of research institutions that have a close relationship with the government:

> I [had] considered for a while researcher in a research institution. The problem is a lot of research institutions in the U.S. is funded by a lot of government, which means security clearance. And obviously because of my status [as an international student], that makes it

> very hard and very few jobs that are not security clearance related. They don't want to hire you when they know you can't switch into different projects.

As discussed, doctoral students' citizenship status functioned as career barriers. This status hindered current career progress, as Sophia reported in the communication phase, as well as career explorations, by eliminating initial possible career options.

Positive career outcome expectations based on previous academic achievement. Three participants in the faculty career group expressed belief that they would be successful as faculty members, considering their previous academic achievements. For example, Victor expected that "I will have a chance to find a job," considering his "groundbreaking research" and the high demand of his research topic in the current academic market. Also, Minhyuk expected that he would secure a faculty position and enjoy a bright future as a faculty member, considering all of his previous academic performance successes:

> I think I can compete or be successful in academia better than in industry and government because I have some evidence that I can do better by publications and the evaluations by my committee members…I'm confident that my choice is I made a right choice and I will keep working on this in the future.

As previously discussed, doctoral students tend to gain more accurate understandings of the responsibilities that faculty members have through direct and indirect experience during their doctoral training. Thus, such tangible academic achievements (e.g., publication, teaching evaluation) might provide these students with a solid source to increase career outcome expectations.

Valuing phase. Unlike other phases, there was no clear pattern identified from the codes. This might be because only a few SCCT-related codes emerged, preventing the identification of patterns. Also, a lower number of SCCT codes seemed reasonable, considering that the

discussions with the interview participants in this phase were concentrated on weighting what they would gain and lose as a result of achieving their sought career paths.

Execution phase. The final theme that emerged from codes of environmental support in this phase was professionals working in the career field of interest as the most frequently reported environmental support. Connected to the interview data, which was analyzed based on a CIP theory, implemented activities and action plans for achieving one's primary career choice from the execution phase were the major sources of this SCCT construct.

Professionals working in the career field of interest as the most frequently reported environmental support. Discussions with interview participants revealed various types of environmental support that they already used or planned to use to achieve sought primary career choices. These include professionals in related career fields, peers, graduate career offices, online job postings, and websites. Among these possibilities, professionals working in the related career fields were the most frequently reported type of environmental support. In fact, nearly half of the doctoral students in this study, regardless of group (n=12), reported it. However, types of professionals as environmental support were different by groups. Similar to the findings in the analysis phase, faculty members, including advisors, were the major environmental support that participants in the faculty career group mainly relied. Interview participants, pursuing faculty careers, noted that faculty members from their departments and others helped them to prepare for the application process (e.g., Victor), gain more relevant experience to be more competitive on a job market (e.g., Marc, Minhyuk), expand knowledge on faculty careers (e.g., Chloe, Troy), and increase visibility through networking (e.g., Kari). For example, Minhyuk realized that he needed to gain teaching experience to achieve his career goal because "last year, I was on the job market too, but it was a total failure because they say that, oh, you don't have any teaching

experience, so we cannot consider your application." He contacted a faculty member in his department, seeking an opportunity to teach before he graduated:

> I talked to the dean of my school, and he helped me to find a course that I can teach. But, as you can see, the courses are fully booked up by other instructors, professors, and graduate teachers, so I was allowed to design my own course.

As described, through the generous support of a faculty member in his department, Minhyuk was able to gain in-depth teaching experience by designing his own course and teaching it as a solo instructor. Similarly, faculty advisors helped Marc to gain "all the teaching training that I have." Moreover, Kari shared that her advisor helped her to attend a conference, resulting in increased visibility in her field:

> I convinced my advisor that he wanted to send me to a conference in Germany. It was at a time that I was still considering maybe industry. That conference, because it was German only, it had all the German professors in my field and a few industry members. So I convinced him to send me there, and he did, so that was a big step…This conference is still very valuable that I attended because now I know names now. And I got the best poster award, so everyone knows me as well.

Through her advisor's financial support, she could attend the conference and build her own network with professionals in her field, especially with faculty members. She indicated it was "one of the best things that could happen." Ultimately, such positive experiences reinforced her aim to pursue a career in academia.

By comparison, the major type of environmental support reported by doctoral students, pursuing non-faculty career paths, in this study, was professionals working in non-faculty fields. Several students (e.g., Alfred, Brenda, Grace) emphasized networking with professionals to gain more information on their sought careers and to increase their visibility to future employers. For example, Grace continually contacted people working in the field of her interest, the industry sector, in an effort to "understand what my job would be like just so that I have reasonable

expectations going in." Also, Brenda reported that she was planning to attend the annual conference in her field to build her own network, especially with people working in government. In addition, Minjung used her personal connections: "I have talked to friends, friends of friends…like quite a bit of people" to gain more practical advice regarding her career pursuit in industry.

Communication2 phase. Primary themes emerged from the codes of outcome expectations and self-efficacy in this phase. Moreover, the final theme was positive outcome expectations despite uncertainty. Connected to the interview data, which was analyzed based on the CIP theory, metacognitions emerged in this phase as the major source.

Positive outcome expectations despite uncertainty. Nearly half of the study participants (five participants from the faculty career group and seven from the non-faculty career group) expected positive career outcomes despite a certain level of uncertainty. Specifically, several students (e.g., Ting, Velinda, Ella) expressed a feeling of uncertainty about whether or not their current efforts would lead to their sought outcomes. However, these students tried to focus on what they could do now to achieve their sought career goals rather than being concerned about something beyond their control in the future. Said another way, they believed that there would be positive consequences in their careers as a result of their continuous efforts. For example, Ting expressed her firm belief about her positive career outcome, which was becoming a faculty in a teaching university. She said, "I think it's very challenging, but I believe if you keep working really hard and build yourself, prepare yourself well enough, I'm sure you will find it [my career path] eventually." Similarly, Ella, who is pursuing an administrative career in higher education, remained attentive to what she could do now to gain a positive career outcome:

> I am happy about the choice that I made, and now I am like waiting for it to actually happen so that I can stop worrying about is it going to happen. That is why I am trying to

> utilize everything that's at my disposal right now in order to hopefully have a good end result.

Other participants (e.g., Minhyuk, Kari, Sophia) felt uncertain about whether or not their chosen careers were right for them even though they believed that they would be successful in their sought career goals. For example, Minhyuk, from the faculty career group, realized that there was no guarantee that being a faculty memory would be easy. However, he anticipated that his current career choice would lead to a satisfying career for him:

> In the future, I might hate my job, maybe five or six years later after I fail to get tenure, but who knows. But currently I'm confident that I can enjoy and also I have a confidence that I can contribute something to the scholar community and to the society… I believe that I like this and I have capacities for that…That's why I have an optimistic view of my future.

Minhyuk maintained a positive perspective for his future as a faculty member, despite certain challenges. The reason is because he was confident that being a faculty member would allow him to do what he enjoys by using his abilities, while also contributing to communities. Similarly, Sophia, who is seeking a career path in industry, was concerned about the possibility that she "might get an offer [from a company that] is not ideal [for what] I want to do." Despite such uncertainty, she firmly believed that, from a long-term view, "I know that it's a path for me to get to my ideal choice in the future," even though it might not be her ideal choice.

Theoretical Connections between CIP theory and SCCT Derived from the Joint Matrix.

Based on the identified final themes from the joint matrix as discussed, theoretical connections between SCCT and CIP theory were also identified. Specifically, this section presents how the SCCT major constructs derived from the final themes in this chapter were connected with those of CIP's CASVE cycle.

Major sources of environmental support. Comparable to the primary themes identified in the previous section, the themes here related to environmental support emerged from the constructs related to CIP theory's communication, analysis, and execution phases (see Table 6.3). These CIP theory's constructs, which connected with SCCT, were identified from the following phases of the interview data: introduction, communication, analysis, and execution.

Table 6.3

Major CIP Sources of Environmental Support

CASVE Cycle	Construct	Participant Group [a]
Communication	External cues	Both
Analysis	Option knowledge (including knowledge source)	Both
Execution	Current and future action plan to achieve a primary career choice	Both

Note. [a] Participant Group = Faculty career group and non-faculty career group

First, external cues, which are a construct of the communication phase, were connected with SCCT's environmental support for faculty and non-faculty career participants. According to the CIP perspective, positive first-hand experiences gained during the doctoral program emerged as enteral cues that led doctoral students in this study to consider their current career choices. Through the joint matrix, participants in the faculty career group indicated their doctoral programs or department, including faculty members, as environmental support, which provided them with positive learning experiences (e.g., teaching assistant, research assistant within their departments). However, participants in the non-faculty career group reported on- or off- campus

employers outside of their departments as environment support that facilitated their career progress (e.g., internship, Student Affairs graduate research assistant).

Moreover, during the introduction and analysis phase, participants shared information about their sought career paths. The occupational knowledge that these doctoral students shared also connected with their perceived environmental support by groups. Similar to the earlier finding, participants in the faculty career group reported their doctoral training environments as career support systems. This is because participants gained various knowledge of faculty careers—such as application preparation and general responsibilities and expectations for faculty members—by attending seminars that were hosted by their department, talking, or observing faculty members. By comparison, non-faculty career group participants indicated that professionals working in the field of interest as a major environment support, helping them to gain non-faculty related occupational knowledge.

Lastly, professionals, working in the fields of interests, emerged as their perceived environmental supports. This emerged from discussions with the interview participants about their current or future action plans to achieve their primary career choices during the execution phase. However, types of professionals, recognized as environmental support, were different by groups. Consistent with the previously identified environmental support, faculty members, including advisors, were a major environmental support for the participants pursuing faculty career paths. Comparably, the major type of environmental support reported by doctoral students, pursuing non-faculty career paths, was professionals working in non-faculty fields.

Major sources of career barriers. As with the primary themes identified in the previous section, the themes related to career barriers emerged from the constructs related to CIP theory's communication, analysis, and synthesis phases (see Table 6.4). These CIP constructs, which

connected with SCCT, were identified from the following phases of the interview data: introduction, communication, analysis, and synthesis.

Table 6.4

Major CIP Sources of Career Barriers

CASVE Cycle	Construct	Participant Group [a]
Communication	External cues	Non-faculty career group
	Gap between current and desired career status	Both
Analysis	Option knowledge	Both
	Personal or family situations	Non-faculty career group
Synthesis	Incongruence with other career options	Both

Note. [a] Participant Group = Faculty career group and non-faculty career group

Regardless of their sought career paths, interview participants in the study indicated the competitive faculty job market as a perceived career barrier. This condition functioned as one of the career barriers for some of the non-faculty participants, resulting in considerations of non-faculty careers (an external cue). By comparison, the participants in the faculty career group did not change their sought career paths, but they still perceived such employment trends as a career barrier that might reduce the possibility of securing their sought faculty position. Further, another career barrier emerged from the discussion. It was about option knowledge during the analysis phase, which was revealed only from non-faculty career participants. As discussed, unlike faculty career group participants, who perceived their doctoral training environment as an environmental support, nearly half of the non-faculty career group perceived that their department did not provide sufficient support for them to prepare for their sought career paths.

Specifically, a lack of information about non-faculty career paths prevents them from their job search preparation.

Moreover, information about particular family situations (e.g., having a baby, recently married) was shared during the communication and analysis phases. These emerged as career barriers, limiting the number of available career options. Note that only female participants pursuing non-faculty career paths identified this career barrier. During the communication, such family-related life events functioned as a factor, redirecting these participants' career choices, shifting from faculty to non-faculty career paths (an external cue). This was due to their perceived multiple role-conflict.

Lastly, the impact of personal situations caused by citizenship status was discussed by participants in both groups as a perceived career barrier during the communication and synthesis phases. During the communication phase, only one doctoral student in the non-faculty career group reported her current international student status, which was coded as a personal situation, functioned as preventing her from accessing certain types of companies that she was interested in (gap between current and desired career status). However, in the synthesis phase, several participants reported that they excluded certain careers, such as positions related to the government, because of their citizenship status as international students. In other words, international student status functioned as a previous career barrier when students explored possible career options before undertaking their current sought career path.

Major sources of self-efficacy. As with the primary themes identified in the previous section, the themes related to self-efficacy emerged from the constructs that related to CIP theory's analysis and synthesis phases (see Table 6.5). These CIP constructs, which connected

with SCCT, were identified from the following phases of the interview data: introduction, communication, and analysis.

Table 6.5

Major CIP Sources of Self-efficacy

CASVE Cycle	Construct	Participant Group [a]
Communication	Metacognition (self-talk)	Both
Analysis	Skills	Both

Note. [a] Participant Group = Faculty career group and non-faculty career group

From the introduction and analysis phase, the majority of the interview participants, regardless of their sought career paths, showed strong confidence in their abilities to perform scholarly tasks. These included conducting research, teaching, or managing research group members. However, when they discussed their desired career status, some of them expressed lower levels of confidence in their abilities to achieve their sought career goals (negative self-talk). Specifically, the current competitive tenure-track faculty job market decreased the confidence of faculty career participants in achieving their career goals. Moreover, the lack of information about non-faculty careers lowered the confidence perceptions of those who pursue non-faculty career paths.

Major sources of outcome expectations. The themes related to outcome expectations emerged from the constructs related to CIP theory's synthesis and communication2 phases (see Table 6.6). These CIP constructs, which connected with SCCT, were identified from the following phases of the interview data: synthesis and communication 2.

Table 6.6

Major CIP Sources of Outcome Expectations

CASVE Cycle	Construct	Participant Group [a]
Synthesis	Congruence	Faculty career group
Communication2	Metacognition	Both

Note. [a] Participant Group = Faculty career group and non-faculty career group

During the synthesis phase in the interviews, several participants in the faculty career path expressed their perceived fit between themselves and their sought career choices. This was based on their perceived previous academic achievement, which they gained during their doctoral training, through direct and indirect learning experiences (e.g., teaching and research experiences). These students expressed their beliefs that they would be successful in their chosen career paths, considering it as a good fit. Further, such positive outcome expectations also emerged from self-talk in the communication2 phase from both faculty and non-faculty career participants. Participants anticipated positive outcomes in their careers so long as they made continuous efforts, despite an uncertain future.

Merging Results of Qualitative and Qualitative Findings

In this section, the qualitative findings that resulted from connecting SCCT with CIP theory through the joint matrix are used to answer research question 3 subpart 2. The approach involves a comparison of the qualitative findings with the findings from the quantitative data analysis (Chapter 4). This comparison considered significant survey findings. For instance, it asks whether significant SCCT factors from the quantitative analysis are consistently related to the SCCT constructs that emerged from the qualitative data. The latter data were derived from

the CASVE cycle (*triangulation*). Simply put, this comparison identifies overlaps and different facets between the two sets of findings.

Overlapping facets between the two sets of findings. The findings of qualitative analyses, based on the joint matrix presented above, confirmed and aligned with the findings that resulted from the statistical analyses (Chapter 4). These overlapping facets emerged from three of this study's SCCT constructs: self-efficacy, outcome expectations, and environmental support.

Strong sense of self-efficacy beliefs expressed by both groups. In terms of self-efficacy, the statistical analyses presented that both groups reported relatively higher levels of CDSE (3.60 from the faculty career group and 3.54 from the non-faculty career group), indicating that both groups perceived a strong sense of confidence in their abilities in career decision-making. Further, the results of the one-way ANCOVA on CDSE provided evidence that there was no statistically significant difference in doctoral students' perceived self-efficacy in their abilities to make their career choices by their sought career paths after controlling all six distal contextual variables.

Similar to the findings of the statistical analyses above, the majority of the interview participants expressed a strong sense of confidence in their abilities and skills, regardless of their sought career paths. Table 6.7 presents examples of student statements derived from the qualitative analyses, illustrating high levels of confidence in their abilities and skills. As indicated by Table 6.7, interview participants in both groups expressed high levels of self-efficacy in their abilities to conduct various tasks, mainly related to scholarly tasks. Their successful academic achievements strengthened their belief about skills that they had, which might relate to their career goal. For example, Fiona was confident that she possessed capabilities to conduct various tasks related to teaching and research based on her previous

successful experience during her doctoral program. These experiences encouraged her to feel more assured about her career choice of becoming a faculty member in a research university. Also, Velinda from the non-faculty career group shared her confidence in her abilities to teach and mentor students. Her confidence derived from her previous successful experience.

Table 6.7

Example Statements Indicating Strong Sense of Self-Efficacy

Participants Group	Example Statement
Faculty Career	Fiona, faculty career group participant: I think it's a lot of what I've done during graduate school has prepared me for that job, not just doing research, but mentoring other students, writing grants, writing papers, presenting. I've been pretty successful at all aspects of that, so I felt more confident about it. And now I feel like I would be good at that job, and so that's why I chose it. Chloe, faculty career group participant: I'm pretty good at communicating presentations and stuff, figuring out how to explain things, either in teaching or in presenting my research and stuff.
Non-Faculty Career	Velinda, non-faculty career group participant: I can do that pretty well, get[ting] in front of an audience and explain[ing] my research…I'm pretty good at working with students, communicating with students, finding a way to connect with students...My current boss had sent me an email recently saying that he was impressed with my ability to communicate with students, so I think that's a strong suit for me. Alfred, non-faculty career group participant: Everything we do is like simulation. Everything is on the computer, so I'm a good programmer. That's why I also work at Wolfram [as] part time [programmer]…I think my analytic skills are fairly high.

Positive expectations regarding the outcomes of participants' career choices. The results of survey analyses indicated that participants from both groups reported relatively high levels of VOE: 3.97 from the faculty career group, and 3.94 from the non-faculty career group. These results indicate that they believed they would be successful in their chosen career paths, regardless of whether they pursue faculty or non-faculty career paths. Further, the results of the one-way ANCOVA on VOE provided evidence that there was no statistically significant difference in doctoral students' perceived outcome expectations based on their sought career paths. This was revealed after controlling all six distal contextual variables. Participants' reflections, which derived from the joint matrix, provided evidence to further understand the findings observed via the survey analyses on VOE.

The qualitative analyses, obtained through the joint matrix, revealed that nearly half of the participants in this study believed that they would gain positive outcomes in their careers so long as they made continuous efforts. Such positive outcome expectations emerged from self-talk in the synthesis and communication2 phases, from both faculty and non-faculty career participants. Table 6.8 presents examples of students' statements, which derived from the qualitative analyses, illustrating the positive career outcome expectations expressed by both groups. As presented in Table 6.8, both faculty and non-faculty career participants expressed their beliefs in positive career outcomes despite anticipated career challenges.

Table 6.8

Example Statements Indicating Positive Outcome Expectations

Participants Group	Example Statement
Faculty Career	Minhyuk, faculty career group participant: I've been very productive in terms of publications and presentations…I think I can compete or be successful in academia better than in industry and government because I have some evidence that I can do better by publications and the evaluations by my committee members…I'm confident that my choice is I made a right choice and I will keep working on this in the future. Ting, faculty career group participant: I think it's very challenging, but I believe if you keep working really hard and build yourself, prepare yourself well enough, I'm sure you will find it [my career path] eventually.
Non-Faculty Career	Ella, non-faculty career group participant: I am happy about the choice that I made, and now I am like waiting for it to actually happen so that I can stop worrying about is it going to happen. That is why I am trying to utilize everything that's at my disposal right now in order to hopefully have a good end result. Sophia, non-faculty career group participant: I think I might get an offer [and it] is not the ideal thing that I want to do, but I know that it's a path for me to get to my ideal choice in the future.

Different sources of environmental support by group. The results of survey analyses indicated significant differences in perceived environmental support. One factor involved rapport with a faculty advisor, according to participants' sought career paths. Specifically, the faculty career group participants expressed higher levels of perceived career support (3.86) and rapport with a faculty advisor (4.31) than those who pursued non-faculty career paths (3.60 and 4.15,

respectively). Related to sources of environmental support, the findings emerged from interview data examination. Application of the joint matrix facilitated a greater understanding of what may have contributed to the group differences observed from the surveys.

Through the joint matrix, the frequently reported sources of environmental supports were different by groups. The reflections of participants in the faculty career group revealed that their doctoral programs or department, including faculty members, emerged as a perceived environmental support. This is because they obtained first-hand experiential learning opportunities to gain the skills and abilities that are critical to faculty careers, such as the positions of teaching assistant and research assistant in their graduate departments. Moreover, participants, who are pursuing faculty career paths, benefited from interacting with their doctoral programs by attending seminars, which were hosted by their department or by talking or observing faculty members. Such interactions within their departments enabled participants to build occupational and job search-related knowledge on faculty careers. However, non-faculty career group participants reported on- or off- campus employers outside their departments as environment support for facilitating their career progress (e.g., internship, Student Affairs graduate research assistant). In addition, over half of the non-faculty career group participants used their own personal connections to gain knowledge on non-faculty career paths instead of relying on their departments. Especially, professionals in the non-faculty field were the most frequently reported environmental support.

Table 6.9 provides examples of student statements derived from the qualitative analyses that demonstrate the different sources of environmental support reported by both groups.

Table 6.9

Example Statements Indicating Different Sources of Environmental Support

Participants Group	Example Statement
Faculty Career	Fiona, faculty career group participant: My department has a lot of ways where you can meet with seminar speakers or meet with new faculty members, have breakfast with them, have coffee with them... In those kinds of formal, but informal interactions, I've learned a lot about what faculty actually do, both when they're really junior and also up to, like, very senior folks, department heads, things like that. Ami, faculty career group participant: My advisor who is also my chair, my dissertation committee chair, has been really helpful in thinking about what this [faculty career] will look like and has mentored me, I feel like, in all of my five years working with her in thinking about what's the day-to-day kind of life of a faculty member. So a lot of that has been through assistantships with her and also, like, the support she provides in the teaching that I do and all that kind of thing…I mean she is probably a pretty important person in thinking about where I want to apply and what makes sense to apply for and that sort of thing.
Non-Faculty Career	Grace, non-faculty career group participant: I have a lot of information about which companies exist and what they do in my field. And part of that is because I'm part of a professional organization for railroad engineers, and we get to go to the national conference for that every year pretty much...They have a career fair at that conference every year specifically aimed at students who haven't entered the industry yet, which is really nice. Cam, non-faculty career group participant: I was working different jobs during my time here as well, such as the Office of Minority Student Affairs. I begin to see those outlets as ways of being involved as a researcher.

As explored in participants' reflections on their environment supports, one potential influence on such group differences in perceived environmental supports is the ease of access to

the reported sources of environment support by groups. The findings of the qualitative analyses demonstrated that participants in both groups had their own environmental support to facilitate their career progress. Nevertheless, the findings suggested that faculty career group participants were more likely to gain various career supports directly from current doctoral training environments. This is because their departments, including faculty advisors, provided knowledge and experiences that have direct connections to the sought career path of becoming faculty members. However, participants in the non-faculty career generally gained relevant occupational knowledge and experiences outside of their departments. Thus, they might have limited resources to gain enough relevant exposure to sufficiently understand their sought career paths. This is particularly true if they stay within their departments and do not make any intentional efforts to build a connection with people in non-academic fields, or seek employment opportunities outside their departments. This finding does not necessarily mean that the non-faculty career participants had negative experiences in their department or negative relationship with their advisors. However, considering that faculty careers were commonly indicated as traditional career paths for doctoral students (Rudd & Nerad, 2015; Thune, 2009), it might be more difficult for non-faculty career participants to gain in-depth knowledge on their sought career paths. Likewise, it may be difficult to secure relevant experiences within their current doctoral programs, compared to those pursuing faculty career paths.

Different facets between the two sets of findings. The findings of qualitative analyses based on the joint matrix presented above confirmed that they were aligned with the findings resulted that from statistical analyses (Chapter 4). These different facets emerged from two of this study's SCCT constructs: self-efficacy and career barriers.

Expressed lower levels of self-confidence in achieving a desired career status. As stated, the survey analyses revealed that the CDSE scores of both groups were above 3.5. These scores indicate that both group participants expressed confidence in about their abilities that related to the career decision-making process. However, the emerged themes, which derived from the reflections of several participants in the groups, provided a different facet of self-efficacy.

Examination of the reflections of the interview participants revealed that participants in both groups had lower levels of confidence in accomplishing their sought career goals despite confidence with their skills and abilities to perform relevant tasks. In other words, self-efficacy was not completely aligned with CDSE. The reason is due to lower self-efficacy perceptions closely aligned with activities related to the job search process. Indeed, such self-efficacy was closely aligned with career search self-efficacy that measures individuals' beliefs in their abilities to perform job search related activities (Solberg et al., 1994). It includes identifying information about jobs and prospective employers, evaluating various aspects of interviewing (e.g., assessing job requirements, conducting an information interview), and conducting networking activities.

Specifically, the current competitive tenure-track faculty job market decreased the confidence of faculty career participants in their abilities to secure faculty positions. Meanwhile, the lack of information on non-faculty careers was a major reason that lowered the perceived confidence of participants in the non-faculty career group. Lower confidence levels did not emerge among all interview participants and the results of survey analyses. Regardless, it is important to recognize that uncertainty about the future, due to either unfavorable job market situations, or insufficient occupational knowledge, may have a negative impact on participants' self-efficacy beliefs about their abilities to achieve their sought career goals, regardless of goal type.

Table 6.10 presents examples of student statements derived from the qualitative analyses. These statements demonstrate perceived lower self-efficacy in terms of securing jobs sought.

Table 6.10

Example Statements Indicating Lower Levels of Self-Confidence

Participants Group	Example Statement
Faculty Career	Nia, faculty career group participant: I think I have a great experience in terms of conducting research. I think I can run a lab if I end up getting my own lab and getting a team. So I'm confident that way. I even have good teaching experience, so I'm prepared that way too…But, I am not as confident [when it comes to job application] …I think I don't know if I am well equipped to have the best application or anything.
	Eli, faculty career group participant: I am less confident of getting the job I want. And particularly that I think that what I want is… There aren't very many opportunities.
Non-Faculty Career	Dorothy, non-faculty career group participant: I'm pretty good at data analysis and acquisition...But, I'm unprepared for a job in industry...I don't have business training, so it would just depend on what my skills can be applied to.
	Joshua, non-faculty career group participant: Still I don't have a very good exposure with the industry. But, probably leading a research team or some specific problem, or be a member of something or be the lead researcher or something...But I have no idea how to go there.

Differences in perceived career barriers by groups. Statistical analyses determined that participants in both groups expressed low level perceptions of career barriers (2.20 for the faculty career group and 2.26 for the non-faculty career group). Moreover, the results of the one-

way ANCOVA indicated there was no statistically significant difference in doctoral students' perceived career barriers. This result was based on their sought career paths and after controlling all six distal contextual variables. The survey findings were not well aligned with the results of the qualitative analyses through the joint matrix. This is because the findings from the joint matrix provided evidence that there was a significant different in codes that emerged from the perceived career barriers by groups in the analysis phase (Table 6.2). Further, emergent primary themes demonstrated that the non-faculty career participants perceived more career barriers than those who pursued faculty career paths.

Although doctoral students in the study indicated the competitive faculty job market as a career barrier, additional career barriers emerged from the reflections of non-faculty career participants. As discussed, the faculty career group participants indicated their current doctoral training environment as an environmental support. However, nearly half of the non-faculty career group perceived their department as a career barrier because they gained little knowledge on non-faculty career paths from their departments. This lack of relevant information prevented them from active engagement in the job search process. Also, two participants in the non-faculty career group mentioned that they felt that their departments did not consider pursuit of non-faculty career paths as desired career choices for doctoral recipients. In addition to the perceived climate of their departments, four female non-faculty career participants indicated their family situations (e.g., having a baby, recently married) as a career barrier, limiting the number of available career options. Such family-related life events increased the participants' perceived multiple role-conflict, redirecting these participants' career choices from faculty to non-faculty career paths. Table 6.11 provides examples of statements from students, pursuing non-faculty

careers, which were derived from the qualitative analyses. These statements demonstrate career barriers reported only from the non-faculty career participants.

Table 6.11

Example Statements Indicating Career Barriers (Only Non-faculty Career *Group)*

Type of Career Barrier	Example Statement
The climate of affiliated doctoral departments	Ella, non-faculty career group participant: I don't feel like we are trained to think about other things outside of faculty positions. I feel a little bit inexperienced in terms of or uneducated in terms of the various things that you can do with a degree like this. Cam, non-faculty career group participant: People who don't become a faculty member [are perceived as] some type of failure
Family situations	Velinda, married, female non-faculty career group participant: It is really hard to get a family or to have a family when you're in academia because it is like your job or your family because there are so much things that you have to do and publish so much and all that. Dorothy, married, female non-faculty career group participant: I had a baby about three months ago. A year ago, we decided to start trying for a baby and I realized that I would like to have predictable work hours instead of working sort of 30 days in a row and then having a few extra days off. I'd like to keep a more standard schedule. And so moving out of animal research would be good for that.

Chapter Summary

One research question which was divided into two sub-research questions guided the inquiries in this chapter:

- In what ways and to what extent do the findings of the quantitative data guided by SCCT and findings of the qualitative data guided by the CIP theory empirically converge and diverge to contribute to a comprehensive and nuanced understanding of the career decision-making processes of ABD doctoral students considering different career paths?
    - In what ways and to what extent do environmental barriers and supports, career-decision self-efficacy and career outcome expectations derived from SCCT relate to each phase of the CASVE cycle?
    - In what ways and to what extent do the identified patterns of environmental barriers and supports as well as self-efficacy and outcome expectations within the CASVE cycle explain the findings of the quantitative data guided by SCCT in this study?

To answer the inquires, participants' reflections on CIP theory guided career choice processes were re-coded via the SCCT guided joint matrix. Major themes relevant to SCCT were identified with a table to show the code distributions of SCCT's four key constructs. These constructs include self-efficacy, outcome expectation, career barriers, and environmental support for each phase of the CASVE cycle. A summary of primary themes relevant to these SCCT constructs emerged from each phase of the CASVE cycle, which is presented in Table 6.12.

Table 6.12

Summary of Primary Themes Through Joint Matrix and Connection with SCCT Constructs

Primary Themes in Each Phase of the CASVE Cycle	Relevant SCCT Construct
Introduction	
• Competitive current faculty job market was perceived as a career barrier	Career Barriers
• Expressed confidence in abilities to perform faculty career related tasks	Self-efficacy
• Different sources of environmental support by group	Environmental Support

Table 6.12 (cont.)

Communication Phase	
• A personal situation functioned as a career barrier limiting career options	Career Barriers
• Expressed lower levels of confidence in landing a job, but with different reasons	Self-efficacy
Analysis Phase	
• Dissimilar views on doctoral training environments: One for career supports and another for career barriers	Career Barriers & Environmental Support
• Built one's own support systems through personal connections	Environmental Support
• Equally expressed confidence in one's abilities to perform scholarly tasks.	Self-efficacy
Synthesis Phase	
• Citizenship status as a factor influencing during career exploration stage	Career Barriers
• Positive career outcome expectations based on previous academic achievement.	Outcome Expectations
Valuing Phase	N/A
Execution Phase	
• Professionals working in the career field of interest as the most frequently reported environmental support	Environmental Support
Communication2 Phase	
• Positive outcome expectations despite of uncertainty	Outcome Expectations

Moreover, this chapter examines the theoretical connections between SCCT and CIP theory—based on the emerged final themes from the joint matrix (Table 6.11). The theoretical connection explained how SCCT major constructs were related to those of CIP's CASVE cycle. Major sources of each SCCT construct are presented in Table 6.13.

Table 6.13

Major CIP Sources of SCCT Four Constructs

SCCT Construct	CASVE Cycle	Construct of Phase	Participant Group [a]
Self-efficacy	Communication	Metacognition (self-talk)	Both
	Analysis	Skills	Both
Outcome Expectations	Synthesis	Congruence	Faculty
	Communication2	Metacognition	Both
Environmental Support	Communication	External cues	Both
	Analysis	Option knowledge (including knowledge source)	Both
	Execution	Current and future action plan to achieve a primary career choice	Both
Career Barriers	Communication	External cues	Non-faculty
		Gap between current and desired career status	Both
	Analysis	Option knowledge	Both
		Personal or family situations	Non-faculty
	Synthesis	Incongruence with other career options	Both

Note. [a] Participant Group = Faculty career group and non-faculty career group

Lastly, these qualitative findings were compared with those of the quantitative data analysis (Chapter 4). This comparison allowed for a triangulation of the two sets of findings. As such, it facilitated answering whether significant SCCT findings from quantitative analysis are consistently related to the SCCT constructs. The results of the triangulation confirmed—and also did not confirm—the significant findings of surveys as summarized (Table 6.14). Moreover, as

Miles et al. (2014) emphasized, counting code distributions, especially conducting an independent sample *t*-test in the study helped researchers to review the hypothesis derived from the quantitative study. In other words, the findings of ANCOVA on career barriers did not support the group difference in the perceived career barriers. However, the finding that resulted from the t-test analysis of the codes distributions on career barriers provided supportive evidence of emergent primary themes. It revealed that non-faculty career participants perceived more career barriers than those who pursued faculty career paths.

Table 6.14

Results of Triangulation Through Data Convergence

SCCT Construct	Findings: Group Difference		Overlapping Facet
	Quantitative Data Analyses	Qualitative Data Analyses	
Self-efficacy	No statistically significant group difference	No theme indicating group differences	Yes
	CDSE scores of both groups were above 3.5 out of 5.00 (close to much confidence)	A theme indicating low confidence levels among both groups in their abilities to achieve their sought career goals	No
Outcome Expectations	No statistically significant group difference	No theme indicating group differences	Yes
	VOE scores of both groups were above 3.9 out of 5.00 (positive expectations)	Positive outcome expectations expressed by both groups	Yes
Environmental Support	Significant group differences in perceived environmental support, including rapport with a faculty advisor	Differences in the ease of access to the reported sources of environment supports by groups	Yes
	Scores of the faculty career group were higher than the non-faculty career group	Current doctoral training environments were directly related to the faculty career group's reported sources of environmental supports	Yes
Career Barriers	No statistically significant group difference	Themes, indicating more career barriers, emerged from the non-faculty career group than the faculty career group	No
	CBS scores of both groups were close to 2.20 of 5.00 (low levels of career barriers)		

Chapter 7

Discussion

This study was motivated by concerns regarding the minimal extant research on doctoral students' career development, prohibiting the customization of career preparation necessary to prepare students with competencies for achieving their career goals. This study sought to address this research need, using mixed methods to investigate how doctoral candidates determine their career choices based on their sought career paths. Using Cognitive Information Processing (CIP) theory and Social Cognitive Career Theory (SCCT) as theoretical frameworks, this study was designed to understand the career decision-making processes of doctoral students. Also, it aimed to identify and examine differences in the career choice processes based on their sought career paths. The research questions examined group differences in doctoral students' perceived environmental factors and career beliefs based on their sought career paths (faculty and non-faculty career paths), explored their cognitive decision-making processes (decisions to pursue faculty or non-faculty careers), and identified overlaps and different facets between the two sets of findings as a result of triangulation. This chapter discusses key findings, proposing theoretical and practical implications. Also, it acknowledges limitations of the study and proposes directions for future research.

Discussion of Findings

This section incorporates the findings presented in Chapters 4, 5, and 6, in accordance with previous literature, and reflections from the peer review session with an external auditor. Because insights derived from examining the processes through which doctoral students determine post-graduate career decisions were the primary contribution of this study, these findings are discussed first. Further, a discussion of the findings focuses on factors that

influenced the career decision-making processes of doctoral students based on their sought career paths. These factors expressed similar or different impacts on the career choice processes by groups. A discussion of the observed outcomes that resulted from triangulation is presented. That sub-section discusses group differences related to the types of proximal environmental and social cognitive factors that affect career choice processes. These were derived from the findings of statistical analyses and joint matrix.

Primary emergent findings of doctoral students' career decision-making processes. Exploration of the career decision-making processes of doctoral students was based on the CIP's CASVE decision-making cycle. This basis facilitated a process-oriented understanding of cognitive and behavioral factors that help individuals to make a career decision (Bullock-Yowell, et al., 2012; Sampson et al., 2004). Thus, this design was expected to increase the possibility of capturing how doctoral students gather, transform, and apply information to make faculty or non-faculty career choices. It also records their feelings during this process, which enabled this study to connect with previous career choice process research. Moreover, it advances literature and practice by inspiring diverse dialogues that address doctoral students' widespread concerns, and in particular, the subject of insufficient career development and guidance for doctoral students (Barnes & Austin, 2009). This section discussed major factors influencing career choice processes, with the recognition of similarities and differences that exist between doctoral students pursuing faculty career paths and those pursuing non-faculty career paths.

Via first-hand experiences during the doctoral program, doctoral students better understand themselves, their career options, and the relationship between themselves and the career options available to them. Krieshok, Black, and McKay (2009) emphasized that occupationally engaging behaviors serve a critical function in establishing satisfying career-

related choices. This is because these behaviors increase a body of knowledge on one's self and the world of work, contributing to a foundation for individual career decision-making processes (Sampson et al., 2004). Occupational engaging behaviors refer to "behaviors that contribute to the decision maker's fund of information and experience of the larger world" (Krieshok et al., 2009, p.284). Examples of such behaviors include first-hand experiences gained through experiential learning (e.g., internship, part-time), vicarious learning (e.g., job shadowing, observing mentor, attending presentations or seminars), and talking with professionals working in their particular fields of interest (Cox, Bjornse, Krieshok, & Liu, 2016).

Confirming the critical role of occupational engaging behaviors, the first-hand experiences gained during the doctoral program emerged as particularly important for doctoral students in the study, regardless of whether they pursued faculty or non-faculty career paths. Discussions from participants, from both faculty and non-faculty paths, revealed that first-hand experience facilitated career decision-making. Experiences functioned as external cues to shift the students' perspectives and potential career paths. Also, their experience served as a source to increase knowledge of one's self and options. Moreover, experiences helped students to further develop a body of self-knowledge by recognizing likes, dislikes, and skills (Cox et al., 2016). Also, it helped doctoral students to realize the career options available to them, thus allowing them to build a functional world-of-work schema (Sampson et al., 2004) Ultimately, such experientially-acquired knowledge enabled students to build an enriched knowledge domain that they might consult during career choice processes. Such resources will help them to understand the relationship between themselves and career options, helping them to realize the career paths that might be a good fit.

Notably, the major types of first-hand experiences were different by group. Specifically, many participants, pursuing faculty careers, gained experiences through teaching or conducting research within their departments as graduate teaching or research assistants. Such activities encouraged doctoral students to aim for faculty career paths. In contrast, participants from non-faculty career tracks were involved with on-campus employment outside their departments or off-campus employment. Such experiences introduced students to a range of career options that might be congruent with their interest, skills, or employment preferences (instead of pursuing faculty career paths).

Further, in conjunction with a theoretical perspective, first-hand experiences often functioned as a nexus between the communication and analysis phases. As discussed, increased self-recognition resulted from involvement of occupationally engaging behaviors. Their involvement facilitated shifting perspectives of potential career paths (Krieshok et al., 2009). According to Sampson et al. (2004), during the analysis phase, individuals tend to engage in "a recurring process" (p.27) of making sense of existing knowledge or gaining new information of self or occupations. Self and occupational knowledge may develop as a result of occupational engaging behaviors that occur during the analysis phase. Knowledge may function as an external or internal signal for individuals to realize career gaps. As such, it appears possible that an additional path exists by which the analysis phase may influence experiences in the communication phase, as indicated by the heavy dashed-and-dotted line in Figure 7.1. Simply put, this study empirically demonstrated a strong interrelated nature of these two phases rather than a one-way impact from communication phase to analysis phase.

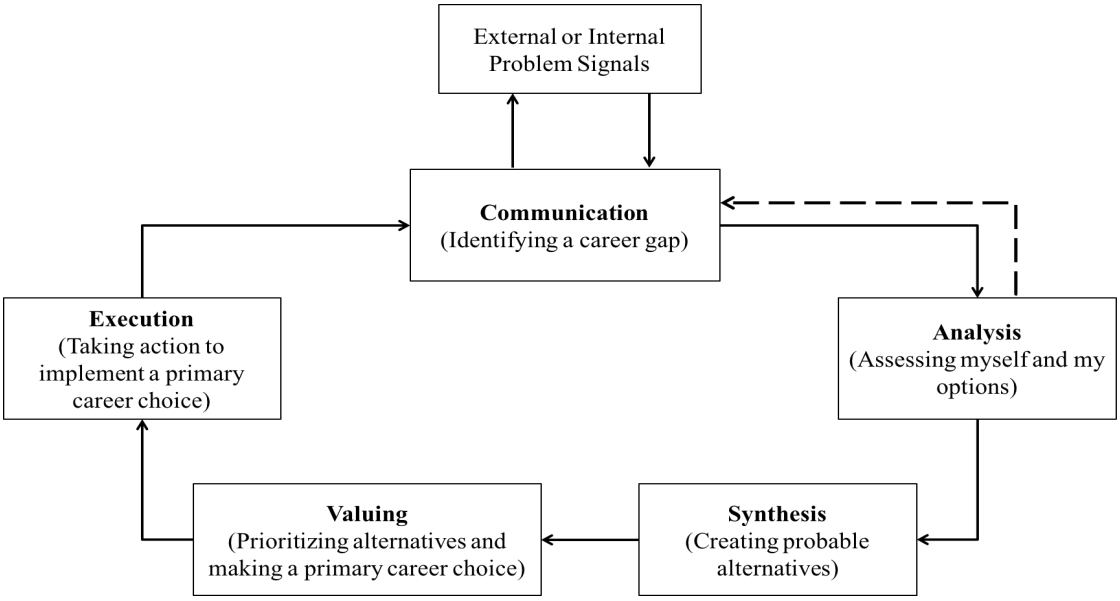

Figure 7.1. The CASVE cycle, with additional path of influence as suggested by the data (adjusted from Sampson, Peterson, Lenz, & Reardon, 1992, the heavy dashed-and-dotted line indicates a proposed additional path of influence)

People serve a key function to increase world knowledge that doctoral students consult for career decisions. Previous research (e.g., Broadbent, Cacciattolo, & Papadopoulos, 2012; Doverspike, Qin, Magee, Snell, & Vaiana, 2011; Sampson et al., 2004) indicated that people serve as key sources of career information. For instance, Doverspike et al. (2011) found that people, such as professors, advisors, family members, and classmates, were reported as trusted sources when college students sought occupational information. Further, after observing experiences of people in the field, Sampson et al. (2004) indicated people as a key source of occupational knowledge in addition to direct experiences. Within the interview research, the majority of doctoral students in this study also indicate that people, especially those who work in the fields of their interest, serve as a major indirect learning source to enhance occupational knowledge of their primary career choices. Most students, pursuing faculty career paths, gained information on faculty careers mainly from observing, talking to, or working with faculty

members inside and outside their affiliated departments during their doctoral training period. This finding is consistent with the literature that emphasized the important role of advisors in doctoral students' career development (Barnes & Austin, 2009; Curtin et al., 2016; Luebs et al., 1998; West et al., 2011). For example, Curtin et al. (2016) found that faculty advisors served a critical role in forming the career interests of doctoral students, especially for faculty career paths.

By comparison, professionals, working in non-faculty fields, such as industry and administrative sectors, were the most frequently reported people by non-faculty career seekers in this study. In this study generally, doctoral students, pursuing non-faculty career paths, gained occupational knowledge mainly from their personal connections (e.g., friends or alumni of their program). Also, doctoral students reportedly gained knowledge through professional connections established as a result of on or off-campus employment (e.g., an internship supervisor). Although the major sources were different by groups, this finding supports the claim that students are more likely to benefit from exposure to various careers, especially careers related to their sought careers. A plausible explanation for its relevance is that such experiences increase their understanding of the world of work that might be applied to career decisions (Lease, 2004). As emphasized by the CIP theory, occupational knowledge enabled students to make more-informed decisions by connecting information collected with their own self-knowledge (Sampson et al., 1999).

By contrast, a lack of opportunities to gain exposure may prevent students from making informed career choices. Based on the interview research, some participants from the non-faculty career group expressed concerns about their career decision—pursuing non-faculty career paths—because of a lack of opportunities to gain occupational knowledge beyond faculty careers, (e.g., Dorothy, Joshua). According to previous research on career readiness, individuals tend to

express reluctance to commit to their chosen career if there is a gap in their knowledge of required options to achieve their career goals (Sampson et al., 2004). This status, observed from these non-faculty participants in the study, was closely aligned to the description of a particular type of indecision status. This type includes "indecisive individuals" (Sampson et al., 2004), "confident but uninformed" (Lucas, 1993; Lucas & Epperson, 1988), or "well-adjusted information seekers" (Kelly & Pulver, 2003). This type recognizes that the acquisition of knowledge, such as self and occupational knowledge, are central needs for individuals at this stage (Kelly & Pulver, 2003; Sampson et al., 2004).

Doctoral students' employment preferences influence their understanding of fit with their career options. A clear distinction emerged in terms of employment preferences between groups throughout the entire career decision-making process. The majority of interview participants on faculty career paths expressed a strong desire for freedom. In contrast, a desire to achieve a more stable and balanced life emerged as a theme among non-faculty career participants. Dissimilar employment preferences influenced how doctoral students in each group understood fit with their current doctoral training environments and more traditional faculty career paths. Specifically, students pursuing non-faculty career paths perceived a lack of fit with their current academic environment and with faculty career paths because of a misalignment with their desire to maintain a life and work balance even. Nevertheless, they expressed a strong interest in continuing research.

Further, this study found that employment preferences might be alterable due to personal life events, particularly a desire for family, marriage, and children, indicating empirical evidence of the claim made by Sampson et al. (2004) that balancing between one's beliefs and the influence of significant others such as family members plays a critical role in making career

choices. In addition, this finding is consistent with the previous studies that reported anticipating conflict in balancing career and personal life as a major factor for doctoral students to decide not to pursue faculty careers (Dabney & Tai, 2013; Fuhrmann et al., 2011).

Notably, this pattern was observed from female doctoral students from the non-faculty career group only (all female participants in the faculty career group indicated single status). Specifically, several female participants (e.g., Dorothy, Hailey, Velinda) in the non-faculty career paths changed their sought career path— becoming a faculty member to pursuing industry or administrative careers—after personal life events, especially marriage and children. Their reasoning was often because non-faculty careers would, in their view, be more conducive to sustaining a balance between personal life and work. Although there were four male doctoral students, who were married and have children (three from the faculty career path and one from non-faculty career paths), this pattern was not emergent from them. In this study, women's strong emphasis on sustaining work–life balance is discussed in existing research. Gender-specific preference indicates that cultural beliefs about gender impact differences in career choices due to social expectations of traditional gender-related roles for as women as primary caretakers (Correll, 2001; Gallhofer, Paisey, Roberts, Tarbert, 2011; Metz & Kulik, 2014; Terosky, O'Meara, & Campbell, 2014). Gallhofer et al. (2011) found that women are more likely to make choices that enabled them to balance their career and personal life. The major reasons for this decision was an expressed desire to spend more time with family, including children, and in alignment with their perceived responsibility to serve a mothering role. Overall, the findings of this study empirically support a previous study by Gibbs and Griffin (2013) that found a personal or professional value as the key driver for doctoral degree holders to decide whether or not to pursue faculty or non-faculty career paths.

Perceived different career gaps between current and desired status explain different types of career behaviors observed by group. All participants in the study reached the same academic status as ABD doctoral students. This status remains, regardless of whether these students pursue faculty or non-faculty career paths. A theme emerged from the communication phase, revealing that their perceived current career status was different according to group. Specifically, participants in the faculty career group often focused on job search activities, such as applying for faculty positions and preparing application materials. Such students considered themselves as job seekers who were already on the job market. This finding is consistent with previous studies (Gardner, 2009; Vanevenhoven et al., 2011). Comparatively, non-faculty career participants were more concentrated on their dissertation progress or current research projects than job search activities.

Moreover, this group difference, according to intended career status, may be explained by different career gaps expressed by groups. When reflecting on their perceived career gap, during the communication phase, faculty career participants were more concerned about the competitive tenure-track faculty job market. Meanwhile, non-faculty career participants expressed concerns about the lack of information on their sought career paths. These variances suggest that different group participants reached a different status in terms of career decision. For instance, the reason that faculty career participants perceived current job markets as a career problem or gap might be because they were actively engaged in the job search process. Individuals at this stage are categorized as "decided-implementation," those who already made career choices and commitments to achieve their chosen career choices (Sampson et al., 2004). By comparison, the non-faculty career participants remained in a career exploration stage, considering their major career problem to gain more knowledge on their sought career paths prior to engaging in any job

search activity. Considering that their major focus was to increase knowledge on their sought career paths, non-faculty career participants in this study were considered at a similar: "well-adjusted information seekers" (Kelly & Pulver, 2003). This consideration is valid even though the non-faculty career participants in this study decided their sought career paths.

Reported by each group's participants during the execution phase, different career behaviors functioned as previously implemented activities aimed to achieve their primary career choices, further confirming these different decision stages. The majority of faculty career participants strategically sought specific scholarly experiences (e.g., teaching, conducting research) to become competitive candidates in a challenging faculty job market (e.g., Minhyuk, Ping). Meanwhile, those who pursued non-faculty careers focused more on finding knowledge of their options as regards sought non-faculty careers. Such information may help them to understand current markets and qualifications required to achieve such careers (e.g., Jack, Cam).

Relationship between SCCT and CIP theory on career decision-making process resulted from triangulation. Grounded in SCCT, this study examined the influences of doctoral students' perceived levels of socio-cognitive and proximal environmental variables that are implicit in the CASVE decision-making cycle. This section provides insights gained by merging results of two strands of data. This data derived from different methods: (1) statistical analyses to examine group differences in doctoral students' perceptions of environmental influences and their career beliefs based on their sought careers, and (2) re-examination of participants' reflections on CIP theory guided career choice processes via the SCCT guided joint matrix. This triangulation facilitated the identification of theoretical connections between SCCT and CIP theory. It recognized overlapping and different facets of doctoral students' career decision-

making process, thus allowing a fuller understanding of the career decision-making processes of doctoral students.

Theoretical connection between SCCT and CIP theory. This section discussed the identified theoretical connections between SCCT and CIP theory via the joint matrix. Specifically, this section presents how SCCT's four major constructs examined in the survey analyses—self-efficacy, outcome expectations, environmental support, and career barriers—related to CIP's CASVE cycle.

Early phases of the CASVE cycle: the major sources of SCCT self-efficacy. From the joint matrix, the early phases of the CASVE cycle, including the communication and analysis phases, emerged as major sources of SCCT self-efficacy for both faculty and non-faculty career groups. Although the self-efficacy beliefs of doctoral students in this study derived mainly from these two phases, the directions of self-efficacy were different. Specifically, both groups expressed low levels of self-efficacy when they reflected on their perceived gap between current and desired career status at the communication phase. Low self-efficacy may reflect anxiety or tension stimulated from individuals' growing awareness of a career gap between where they are and where they want to be (Peterson et al., 1991; Sampson et al., 2004). By comparison, a strong sense of confidence in their abilities and skills was revealed from both group participants. This became apparent as students described their skills during the analysis phase. Strong self-efficacy may be connected with the process of clarifying self-knowledge during the analysis phase (Sampson et al., 1992; 2004). Moreover, doctoral students were more likely to perceive a strong sense of confidence during the analysis phase than the communication phase due to their active reflection on self-knowledge, especially skills.

Positive self-talk in the communication2 phase indicated positive outcome expectations. From the joint matrix, positive outcome expectations emerged from the last phase of the CASVE cycle, the communicaition2 phase, for both career groups. Although both group participants exhibited a mix of excitement and fear about their futures, positive self-talks and self-awareness immediately redirected them to focus on what they could do now to gain positive career outcomes.

Communication and analysis phases of the CASVE cycle: The major sources of SCCT proximal environmental influences. From the joint matrix, the communication phase and analysis phase emerged as major sources of SCCT proximal environmental influences, career barriers, and environmental support. This is true for both faculty and non-faculty career groups. Regarding the emergent environmental support from the joint matrix, the external cues in the communication phase and knowledge of options, in the analysis phase, emerged as major sources for both faculty and non-faculty career groups. Positive first-hand experiences gained during the doctoral program emerged as external cues for both group participants. The sources of these first-hand experiences functioned as doctoral students' perceive environmental support. Sources of options knowledge that participants gained, regarding their sought career paths, revealed itself as an environmental support.

For students, pursuing faculty career paths, doctoral training environments, including faculty members, were indicated as career support systems. Meanwhile, on or off campus employers outside their departments, and professionals working in non-faculty career fields, were identified as environment supports for those pursuing non-faculty career paths. Their intention for such support was to facilitate their career progress. Indeed, this theoretical connection may relate to the outcomes of occupational engaging behaviors. Active occupational

engaging behaviors (e.g., direct experience, vicarious learning) function as key sources to gain self- and world knowledge (Krieshok et al., 2009; Sampson et al., 2004), which enables individuals to build a strong knowledge domain. Ultimately, it helps reduce a perceived complexity, while providing valid links between self and careers. This connection facilitates an individual's career decision-making process (Sampson et al., 2004). Doctoral students' occupational engagement in the study functioned as external cues to become aware of their potential career pursuits or sources to acquire occupational knowledge from the CIP theory. Comparatively, such occupational engagement served as environmental support to facilitate doctoral students' career progress from the perspective of SCCT.

Further, the communication and analysis phases were major sources for another proximal environmental force: career barriers. Through the joint matrix, three different career barriers were identified. First, doctoral students from both groups in this study perceived the current competitive faculty job market situation as a career barrier. This barrier emerged from the perceived career gap and external cues in the communication phase, as well as options knowledge in the analysis phase. Specifically, faculty career group participants shared their reflections when discussing the perceived gap between current and desired career status in the communication phase and as option knowledge in the analysis phase. Meanwhile, non-faculty career participants indicated the negative market situation as an external cue to prompt reconsideration of their original career choice, faculty careers. Reflection on this cue resulted in changing to non-faculty careers.

The remaining two career barriers were identified from non-faculty career participants only: (1) lack of career information, and (2) perceived multiple role-conflict. These barriers emerged from external cues in the communication phase and family situations in the analysis

phase. The participants, pursuing non-faculty careers, expressed that a lack of information on non-faculty career paths prevents them from job search preparation. This career barrier emerged as they described occupational knowledge of their sought career paths, during the analysis phase. This theoretical connection may relate to a critical role of the knowledge domain in the CIP theory. As discussed, a knowledge domain, including self and occupational knowledge, serves as a foundation to facilitate progression through the CASVE cycle (Sampson et al., 1992; 2004). However, if individuals are exposed to restricted environments only, where a limited number of career-related activities are provided, they are more likely to obtain narrow knowledge of the world of work (Robinson & Howard-Hamilton, 2000; Sampson et al., 2004). From an SCCT perspective, this myopic view may be considered as a career barrier because it makes the career progress difficult (e.g., Swanson et al., 1996). Moreover, the perceived multiple role-conflict emerged as a career barrier for female non-faculty career participants who desired to maintain a balance between career and personal life. CIP theory emphasizes consideration of the complexity that an individual bears in terms of family, social, or organizational factors, and its impact on the individual's career decision-making process (Sampson et al., 2004). Especially, individuals with multiple family responsibilities tend to choose a career that compromises their professional desires, instead performing other life roles, such as spouse or caregiver (Raskin, 1996; Sampson et al., 2004). This barrier derived from a reflection of non-faculty participants on external cues during the communication phase and family situations during the analysis phase. Further, consideration of the effects of this external factor during the CASVE cycle may connect with SCCT by capturing a type of career barrier: multiple-role conflict (e.g., Swanson et al., 1996).

Convergent and divergent outcomes based on group differences observed in SCCT constructs. This section provides insights gained by comparing the qualitative findings that

resulted from the joint matrix with those of the quantitative data analyses. Specifically, this comparison was conducted to answer the following inquiry and identify overlapping and different facets of doctoral students' career decision-making process. It asked whether statistically significant findings of the quantitative analyses are consistently related to the themes associated with the SCCT constructs that emerged from the interview data grounded in the CASVE cycle.

Strong self-efficacy beliefs in abilities to perform scholarly tasks expressed by doctoral students, regardless of sought career paths. The findings of ANCOVA on CDSE revealed no statistically significant difference (p = .37) between the faculty career group (adjusted M =3.60) and non-faculty career group (adjusted M =3.54). The majority of interview participants, regardless of sought career paths, expressed a strong sense of confidence in their abilities and skills to conduct various tasks, mainly related to scholarship. Further, such beliefs derived from successful academic achievements (e.g., Fiona, Velinda). This finding provides empirical evidence that the reason for doctoral students to pursue non-faculty career paths was not related to a lack of skills or ability to perform scholarly tasks, such as teaching or conducting research. Rather, they related to a perceived fit based on their interest or employment preferences. This finding echoes previous empirical research on doctoral students' career-interest formation processes, as conducted by Gibbs and Griffin (2013), for example. Through focus group interviews, Gibbs and Griffin found that doctoral students were more likely to formulate their career interests based on their personal values. Specifically, participants interested in pursuing faculty career paths placed greater value on freedom or the ability to pursue what they care about (e.g., research). Meanwhile, participants interested in non-faculty careers placed emphasis on their work with a higher level of applicability to their fields. These findings may suggest that

doctoral students' decisions to pursue faculty or non-faculty career paths are not related to their abilities to conduct scholarly tasks (e.g., research, teaching). Instead, they correlate with personal or professional values.

Positive career outcome expectations expressed by doctoral students, regardless of sought career paths. Similar to the findings of ANCOVA on VOE—indicating no statistically significant difference ($p = .67$) between the faculty career group (adjusted M =3.97) and non-faculty career group (adjusted M =3.94)—the interview participants in both groups expected positive career outcomes. Although they recognized a certain level of uncertainty about the future, these participants quickly managed their negative thoughts. This was accomplished by redirecting their focus to what they were able to do to increase their chances of obtaining their desired career goals rather than letting negative self-talk interfere with their career decision-making processes. As previous studies reported, there was a strong and positive impact of self-efficacy on outcome expectation (Cunningham et al., 2005; Byars-Winston & Fouad, 2008; Lent et al., 2003). Subsequently, it is possible that strong self-efficacy beliefs expressed by interview and survey participants reflect positive expectations of their career outcomes. However, these findings are inconsistent with a previous study that reported negative outcome expectations expressed by the majority of the participants pursuing faculty career paths (Gibbs & Griffin, 2013). This incongruence may be explained by different characteristics of research participants in each study. The participants of this study were doctoral candidates (not yet graduated). Doctoral recipients, who were involved with postdoctoral training and seeking faculty career paths, were recruited for Gibbs and Griffin's (2013) study. Considering the status of the participants of Gibbs and Griffin's (2013) study (as job seekers on job markets for a greater

duration than the participants of the current study), participants' negative outcome expectations for securing a faculty position may be expected.

The ease of access to environmental supports may explain the observed significant group differences in perceived environmental supports. The result of ANCOVA demonstrated that doctoral students, pursuing faculty career paths (*adjusted M*= 3.86 for support, 4.31 for rapport), perceived significantly higher levels of environmental support (*p*= *.001*), including rapport with a faculty advisor (*p*= *.04*), compared with those who pursued non-faculty career paths (*adjusted M*= 3.60 for support, 4.15 for rapport). The result of the comparison of SCCT themes, derived from the joint matrix, with findings of the quantitative data (guided by SCCT), provided evidence for the statistically significant group differences observed from survey data.

Considering the primary themes that emerged from participants' reflections on their environment supports via the joint matrix, different levels, with regard to the ease of access to the reported sources of environment supports by groups, was revealed as a potential influence. Ostensibly, it affected group differences in their perceived environmental support. Doctoral students, pursuing faculty career paths, reported major sources of career support to be faculty members and departments. Meanwhile, professionals, working in the non-faculty fields, were reported as the major source of support for those who pursued non-faculty career paths. Further, academic environments, especially their affiliated departments, including faculty advisors, are the most common interacted and direct environment for doctoral students (Weidman, Twale, & Stein, 2001). It seems easier for doctoral students, pursuing faculty career paths, to gain learning experiences and knowledge without leaving their current academic environment. This is evident since their daily lives were directly related to their sought career paths: faculty careers.

Multiple career barriers observed from reflections of non-faculty career participants. There was no statistically significant difference in doctoral students' perceived career barriers ($p = .41$) between the faculty career group (adjusted M =2.20) and non-faculty career group (adjusted M =2.26) from the survey analyses. A greater number of career barriers were reported by the non-faculty career participants based on the results of the joint matrix analyses. According to the joint matrix analyses, a significant difference in a code distribution of career barriers by groups was observed. Moreover, emergent primary themes via the joint matrix revealed that non-faculty career participants perceived more career barriers than those who pursued faculty career paths.

For the participants pursuing faculty career paths, the competitive tenure-track faculty job market situation was identified as their perceived career barrier. However, two other career barriers emerged from reflections by the participants pursuing non-faculty career paths in addition to the competitive faculty job market. First, a lack of occupational knowledge on their sought career paths was reported as a career barrier. As discussed, lacking environment support around their current doctoral environments may explain why only non-faculty career participants reported this barrier. Similarly, Gibbs and Griffin (2013) found that half of the doctoral students that participated in their study indicated that their interest in pursuing a faculty career path was mainly formed by a lack of knowledge on other career options available to them. This observation revealed a lack of understanding of the world of work, which may prevent informed career choices (Krieshok et al., 2009; Sampson et al., 2004). Second, the perceived multiple role-conflict emerged as a career barrier only for female non-faculty career participants who desired to achieve work–life balance. These issues were determinative in female participants' decisions to pursue non-faculty careers. This theme was not discussed among male participants in similar

family situations. Supporting the findings of this study, prior research revealed that multiple role conflicts might influence female doctoral students' decisions to pursue non-faculty career paths (Fuhrmann et al., 2011; Gibbs & Griffin, 2013). This study provides evidence confirming that career-family conflict is particularly problematic for women's career development (Betz, 1995; Metz & Kulik, 2014; Quimby & O'Brien, 2004; Terosky et al., 2014).

Implications

This section discusses theoretical and practical applications. The following implications emerged from the current study, adding new knowledge to career development research. Also, they apply and reinforce existing career development theories. These implications offer guidance for HRD, especially for career development practitioners in higher education to encourage doctoral students to maximize their abilities as knowledge workers inside and outside academia.

Theoretical implications. The findings of this study extended previous research regarding research design, theoretical application, and suggestions for new conceptual links.

Research design. Strength of this study relates to its research design. It provides comprehensive understanding of the dynamics and complexities of the investigated phenomenon by using multiple research methods. Most empirical research—on career decision making grounded in the CIP theory or SCCT—employs a quantitative method to examine the relationships among variables and outcomes. Consequently, the research often offers insufficient insights as to why or how certain findings were generated. This study adopted a convergent parallel mixed-method approach to the comprehensive empirical support of career decision-making research, especially on doctoral students, through the use of multiple research methods and theories. This balanced mixed design offered opportunities to develop a greater understanding of doctoral students' career decision-making processes through interviews and

connect with previous studies that are primarily quantitative through the quantitative findings of the study, which was used extant survey instruments, such as CDSE, VOE, CBS, and Rapport.

The findings demonstrated the strengths of this mixed methods design by revealing the processes by which doctoral students arrive at a certain career decision as they progress through a decision-making cycle, which captured participants' own perspective, by examining the effects of contextual and cognitive variables in career choice processes based on participants' sought career choices, and by identifying different and overlapping facts of participants' career choice experiences emerged from the two data sets. Also, this research design strategy responded to an evident need in the field to incorporate qualitative research to better understand the complex nature of career choice processes (Luzzo, 1999; Rivera, Chen, Flores, Blumberg, & Ponterotto, 2007).

Theoretically-grounded research. Career development researchers have committed to clarifying how a career choice is made. However, minimal extant research on doctoral students' career development is grounded in a theoretical model. Prior to the current study, this lack hindered the advancement of understanding the career decision-making processes of doctoral students. Significantly, this study addressed this research gap by employing SCCT (Lent et al., 1994, 2000) and CIP theory (Sampson et al., 1992; 2004) as the primary theoretical foundations. Building on the well-established career-related theoretical frameworks, this study contributed to current doctoral career development research by expanding theoretical understandings of how doctoral students made career choices. Also, this study connects its research findings with previous theory building and theory-testing literature. Ultimately, it contributed to enhancing an otherwise insufficient understanding of doctoral students' career development (e.g., Allum et al.,

2014; Lee et al., 2011; Wendler et al., 2012) based on empirical and theoretically grounded insights.

Contribution to Social Cognitive Career Theory. Supporting previous research—recognizing SCCT as an effective theoretical framework for understanding the effect of proximal environmental forces on an individual's career decision-making process (e.g., Lent & Brown, 2013; Lent et al., 2003; Swanson et al., 1996)—the findings of this study provided confirming evidence of the roles of environmental supports and career barriers in individuals' engagement in the career choice process (Lent et al., 1994). Based on findings derived from the joint matrix, evidence was found that the environment supports of doctoral students performed as sources to build skills, increase understanding of themselves (e.g., interest, value), gain knowledge of the world of work, better understand their fit with potential career paths, and assist to implement activities for career goal achievement. Although a significant group difference was not found from the survey analyses, the findings from the joint matrix demonstrated an influence of career barriers on students' behaviors in the career choice process, especially for non-faculty career paths participants. Their perceived career barriers (e.g., a lack of career information, perceived multiple role-conflict) prevented non-faculty career participants from actively participating in their job search preparation. Also, it compromised their career choices. This finding is consistent with previous SCCT studies (e.g., Quimby & O'Brien, 2004).

Contribution to the Cognitive Information Process theory. This study provided supportive evidence for the CIP theory (Peterson et al., 1991; Sampson et al., 1992; Sampson et al., 2004). In particular, it regards the role of the knowledge domain in the career choice process. As proposed by the CIP theory, the findings of this study provided empirical evidence that the knowledge domain served a critical role in career choices. Based on doctoral students'

reflections on their career choice processes, increased knowledge of themselves and career options functioned as bases for further consideration throughout the CASVE cycle. These bases facilitate the assessment of relationships between themselves and career options. Also, they help students to identify the career paths that might be a good fit.

Further, this study extended the potential usage of CIP theory, especially for qualitative research. Previous research grounded in CIP theory was largely quantitative with a strong focus on the Career Through Inventory (CTI) measurement. Thus, minimal empirical evidence was available in past literature to display the entire process through which an individual makes career choice. Likewise, previous research offered minimal insight regarding how students implement their career goals, as described by the CASVE cycle. This study's qualitative aspects responded to this apparent gap by investigating how doctoral students made career choices. Such decisions were guided step-by-step by the CASVE cycle.

Lastly, the findings of the study suggested a new conceptual link in the CASVE cycle. The analysis phase could influence experiences in the communication phase. This additional path was not present in the initial CASVE cycle presented by Sampson et al. (2004). The study's findings demonstrate that first-hand experiences might provide a mediating function to interconnect the communication and analysis phases. This study empirically demonstrated a strong interrelated nature of these two phases. It expanded another one-way impact approach from the analysis phase to the communication phase. CIP theory describes in the CASVE cycle that individuals may sometimes shift to an earlier phase if there is no sufficient progress in their current phase. This finding suggests that the interrelated nature between communication and analysis phases may need to be considered as permanent. Further research remains necessary to empirically support this additional path. Nevertheless, this new theoretical link might influence

how researchers and practitioners facilitate doctoral students' career choices. For researchers, this finding provides a research opportunity to integrate theoretical career choice processes. For example, researchers might examine whether a newly obtained self or occupational knowledge (during the analysis phase) may be used for participants' reflection. It may identify a career gap not previously recognized. For practitioners, it signals a need to create space for guided reflection through simple career interventions. Activities include journaling, or written exercises, for doctoral students to make sense of their recent first-hand experiences. Such activities may help students to recognize newly learned self or occupational knowledge. Ultimately, such enhanced understanding may serve as a factor to realize their internal or external cues, allowing doctoral students to clarify a career gap that they have not recognized before.

Contribution to theory convergence. A primary contribution of the current research presented a theoretical integration of SCCT and CIP theory. This study contributes to the literature on theory convergence by responding to a need for developing a more comprehensive theoretical understanding of how career decisions are made and executed (Patton & McMaho, 2014). Supporting the existing literature on theory convergence between CIP theory and SCCT (e.g., Bullock-Yowell et al., 2011; Bullock-Yowell et al., 2012), this study provided confirming evidence that these two theories are appropriate for theory convergence, as proposed by Hackett and Lent (1992). Further, the design of this study aimed to promote a theoretical understanding of how these two theories may be connected throughout the entire career choice process. This approach was not offered by previous research on CIP theroy and SCCT integration. Through the triangulation that resulted from the joint matrix analyses, the study's findings demonstrated that early phases of the CASVE cycles—especially communication and analysis phases—were major sources of SCCT self-efficacy as well as proximal environmental influences (e.g., career barriers,

environmental support). Moreover, positive self-talk that emerged in the communication2 phase was connected with outcome expectations. Ultimately, the theory convergence implemented in this study provides empirical evidence of SCCT as a useful theory for considering environmental and socio-cognitive influences on the career choice process when it is integrated with other theories, especially with the CIP theory, where environmental barriers, support, and socio-cognitive variables are relatively implicit in its decision-making process.

Practical implications. Reflections on this study's findings and the discussion between the researcher and external auditor provide implications and recommendations for professionals involved with doctoral education. It is especially applicable for career or talent development professionals, faculty members, and graduate program administrators.

Facilitate occupational engaging behaviors from the early stage of a doctoral program. According to this study, doctoral students increased self and occupational knowledge through occupational engagement (e.g., experiential learning, vicarious learning) during their doctoral programs. This knowledge facilitated their career decision making. Occupationally engaged behaviors gained during the program, especially first-hand experiences serve as indirect environmental supports. Such supports provide access opportunities for exposure to different types of career options and skill-building practices. Further, positive experiences promote participants' self-efficacy through successful performance attainment (Bandura, 1997). Simply put, these opportunities for occupational engagement provide supportive environments that ultimately facilitate doctoral students' career progress. This was observed from doctoral students regardless of whether they pursue faculty or non-faculty careers. The results of this study suggest the importance of providing a range of first-hand experiences to promote students' exposure to various career possibilities from the early stage of a doctoral program. Consistently, faculty

members and career counselors might promote and encourage occupational engagement in doctoral students prior to focusing on their career decisions.

Faculty members were a major source in this study for students to gain faculty-related career experiences. Therefore, faculty members may develop balanced research and teaching opportunities for doctoral students from the early stage of the program. This may be accomplished through a volunteer opportunity, credit-based internship, or assistantship. As indicated by several doctoral students in the study, it is also important for faculty members to recognize how their behaviors could be direct learning sources, impacting doctoral students' career choices (Fuhrmann et al., 2011; Gibbs & Griffin, 2013). Additionally, career development professionals may serve as facilitators for doctoral students to consider a range of first-hand experiences beyond faculty career paths. This may be accomplished by providing career interventions designed to increase occupational engagement. For example, career interventions might involve offering opportunities for job shadowing, volunteering, finding on- or off-campus opportunities, creating job/internship search strategies based on doctoral students' needs and interests, hosting career fairs tailored to doctoral students, and helping doctoral students identify their available networks for career-related support. In addition to such direct career interventions, career development professionals provide career services (e.g., individual appointments, workshops) that could reduce students' perceived career barriers by increasing motivation for occupational engaging behaviors.

To more effectively increase the occupational engagement of a range of careers, it is critical to build a strong partnership between faculty members and career development professionals. These networks may provide clear and consistent career resources for doctoral

students to amass experientially based knowledge of self and careers prior to making career choices.

Intentional efforts to increase knowledge of non-faculty careers. Due to a recent critical workforce misalignment in tenure-faculty job markets for doctoral degree holders (Rudd & Nerad, 2015; Ruth & Tan, 2011), an increased number of doctoral students seek career opportunities outside the professoriate. Especially, doctoral students desire to find non-faculty career paths that enable them to continue using their skills and knowledge (Fuhrmann et al. 2011; Thune, 2009). However, doctoral students who were pursuing non-faculty career paths in the study expressed concern about a lack of information about non-faculty career paths. In particular, these students were not sure how their acquired skills and knowledge might be applied to their chosen career paths. Note that this finding was not observed among faculty career participants. This dissimilarity implies necessary intentional efforts from graduate education and career development professionals. Faculty members may consider collaborating with career professionals or PhD alumni who work in the non-faculty career fields. These collaborative efforts may aim to create new curriculum or to modify current curriculum, thereby supporting doctoral students' career development. For example, faculty members might design introductory courses to encourage doctoral students to consider career paths more broadly and earlier in their doctoral programs. If there is a financial barrier to creating a new course, faculty members might make modest adjustments to incorporate core career competencies into current curriculum. Moreover, career professionals and faculty members might work together to create online or offline resources to help doctoral students gain in-depth understanding of career options available in non-faculty career paths. Additionally, these resources may facilitate students'

transformation of academic experiences and skills to careers in industry, government, higher education, and nonprofit organizations.

Break the myth of "non-traditional" career paths. Findings from this study should be of interest to anyone involved with doctoral education. This includes faculty members, career development professionals, administrators, future employers, current and future doctoral students. It is relevant for them because the results provide important insight that combats the myth of "non-traditional" non-faculty career paths. A doctoral education is often considered as quintessential preparation for a faculty career. Subsequently, a faculty position is an expected career goal for doctoral students (Curtin et al., 2016). Commonly, career options besides faculty careers are considered "alternative" or "non-traditional" career choices (Enders 2004; Wendler et al., 2012). Often used binary career options for doctoral students—academic or non-academic career options, or faculty or non-faculty career options—is another example of this perspective. As two participants expressed during the interviews, students pursuing non-faculty career paths are often considered as "failures" (e.g., Joshua, Cam). However, this study found that the majority of interview participants, regardless of sought career paths, expressed strong self-efficacy beliefs in their abilities to conduct scholarly tasks. Such tasks include teaching and research. The majority of participants desired to find a career that would enable them to continue research.

This finding suggests that the decision of whether or not to pursue a faculty or non-faculty career path may not be attributed to a lack of skill or ability to perform scholarly tasks. Instead, the decision is related to one's perceived fit, which is based on interests or values that individuals seek in their careers. Drawing from these empirical results, faculty members and career development professionals might exert intentional efforts to educate the abovementioned

doctoral education key stakeholders to limit prejudicial perspectives and reduce doctoral students' perceived anxiety toward non-faculty career paths.

Provide a continuous support to facilitate a successful career transition. Study participants expressed a low confidence level for accomplishing their sought career goals. This was observed from doctoral students regardless of whether students pursued faculty or non-faculty career paths. Moreover, anxiety was also observed when students discussed their anticipated career outcomes. Despite believing in eventual positive career outcomes, participants expressed uncertainty about whether or not their current efforts would lead to outcomes sought. These patterns were observed consistently, and perhaps unexpectedly, from participants who even expressed confidence in their abilities and skills to perform tasks relevant to their sought careers. Career development professionals and faculty advisors might alleviate perceived career challenges by providing continuous support. This effort might enhance students' confidence levels and beliefs in their career outcomes, especially during the transition from university to workforce. Further, doctoral students might actively identify their available networks of social support to reduce negative thoughts during the transition.

Recognize the complexity caused by multiple role conflict and its impact on doctoral students' career decision making. This study found a perceived multiple role-conflict as a unique career barrier that emerged from female doctoral students pursuing non-faculty career paths. Several female participants' reportedly constant struggle for work-life balance led them to change their career choices from faculty careers to non-faculty careers. Unlike traditional college students, doctoral students so inclined tend to start a family prior to earning their degrees, which is more common for women (Pop & Wiest, 2016; Shepard & Nelson, 2012). Consequently, female doctoral students are more likely to experience multiple role-conflicts to balance family

and career, which can cause depression (Pop & Wiest, 2016). From this study's findings and previous research, campus units (such as career centers, counseling centers, and doctoral programs) may consider educating professionals and faculty members about the complexities that doctoral students experience. Moreover, it is crucial to assist with students' understanding of these life events that impact their well-being on campus shape their career aspirations.

Research Limitations

The current study identified several limitations that might inform further research and enhance the quality of corresponding research. First concerns the potential to generalize about findings. The quantitative and qualitative data of the study were collected from a single source: a single public research-oriented university in the Midwestern United States. Thus, the findings of the study were not able to represent the career experiences of various doctoral students enrolled in U.S. higher education institutions. Also, this study was limited to a relatively homogeneous participant group: doctoral students who passed the preliminary exam. These all-but-dissertation (ABD) stage students already made career decisions. The study aimed to recruit a research sample to represent the target population. Admittedly, the findings of a particular doctoral student population sample may not reflect the career decision-making process experiences of doctoral students overall. Indeed, it might not fully reflect those at an early stage or middle stage of their doctoral programs. Moreover, ABD doctoral students who have not decided on their career choices may not be fully represented, either. Investigating whether the stage of a doctoral program differentially affects doctoral students' career choice processes offer important areas for future research. Thus, careful caution is strongly encouraged when considering any application of the implications of this finding to doctoral students at the same stage as the participants of this study, other student populations, or other higher education institutions.

Second, the findings of the study relied primarily on self-reported survey instruments and interviews. Other relevant sources, such as participants' academic transcripts or universities, were not collected as part of the proposed research questions. Such documents, however, might be used as additional data to verify participants' perceived confidence about their skills and abilities. Of course, this study cannot avoid the possibility that responses were influenced by participants' tendency to respond in ways that be viewed as socially desirable. Despite this limitation, self-reported data collection is more appropriate to the purpose of this study. Indeed, it explored doctoral students' internal process of career decision making and their perceived effects of contextual influences on pursuing their sought post-graduate career paths. Moreover, this study integrated qualitative and quantitative data to obtain a defensible conclusion as a result of triangulation on the investigated phenomenon.

Third, this study did not examine an entire structure of SCCT, which might compromise full recognition of the influences yielded by other SCCT variables. These include, for instance, interest, goal/intentions, and performance on doctoral students' career choices. Future research may consider integrating the entire structure of SCCT with the CASVE cycle to fully capture other important effects yielded by these other SCCT variables.

A final limitation of this study concerns the possibility that it might not completely capture the original theoretical framework of the CASVE cycle. The aim of the CIP theory is to help people "make an appropriate current career choice" (Sampson et al., 2004, p.2). Consequently, the CASVE cycle may be considered as a model that conceptualizes the career choice process of individuals who have not decided their career. However, as discussed, the participants of the study were ABD doctoral students who already chose their career paths. These interview questions were developed based on each phase of the CASVE cycle. Participants'

responses underwent reviews by two doctoral-level researchers familiar with this theory. Regardless, interview data yielded by this study might not avoid the possibility of failing to fully account for the career decision-making process proposed by the CASVE cycle. Also, caution is recommended when interpreting the findings of this study.

Directions for Future Research

Based on the findings of this study and the limitations discussed, recommendations for future research are provided. First, since the findings of the study were derived solely from a single public research-oriented university in the Midwestern United States, it remains necessary to diversify research on the career choice processes of doctoral students. Diverse doctoral student populations—such as students not decided on their career choices, and those at an early stage of their doctoral programs—should be considered in future research. It is especially important to conduct a similar research at other countries where there are similar career concerns, such as the UK, France, and Spain because such studies would provide a more comprehensive understanding of the career decision-making processes of doctoral students across various contexts. Additionally, they also help understand how the cultural and social norms of each country influence the career choice process of doctoral students. Cross-cultural research would promote cross-cultural comparisons in this regard.

Second, based on the nature of career development as a lifelong process, more longitudinal research is recommended. A longitudinal research design may facilitate a more in-depth understanding of the career decision-making processes of doctoral students at different program stages. The stages include newly admitted, pre-prelim, post-prelim, final dissertation, after graduation. This approach would delineate how career decisions are made during doctoral

students' formative years in their degree programs, in addition to the university-to-workforce transition period.

Third, the study focused mainly on group differences derived solely from doctoral students' sought career paths (faculty versus non-faculty career paths). Thus, the one-way ANCOVA was applied to examine the group differences by controlling the effects of other important distal contextual variables (e.g., gender, ethnicity, marriage status, academic fields). As an exploratory study, this quantitative research design represents an intentional effort to capture how doctoral students might make career-related decisions differently based on their sought career paths. Although the interview analyses facilitated a broader understanding of how some of these controlled distal contextual variables (e.g., marriage/civil partnership status, citizenship status) influenced doctoral students' career decision-making processes, the study remains limited and may fall short of fully capturing the impact of these distal contextual variables, since it was not the major focus. In response to this limitation, possible future research directions are proposed to diversify research by focusing on diverse student populations (e.g., age, gender, citizenship status, ethnicity, socioeconomic status, marriage/civil partnership status).

Fourth, the identified different facet on career barriers by group, which resulted from comparing quantitative data with qualitative data by group, suggests a possible area for future research. This study used the CBS scale (Lent et al., 2001) to measure doctoral students' perceived career barriers. However, the CBS scale was originally developed to measure college students' math/science related barriers and supports. Thus, there is a possibility that this scale might not fully cover career barriers that doctoral students perceived. Examples include multiple role-conflicts to balance family and career, which emerged from qualitative analysis of the study. In other words, there might be an issue with the survey instrument not being particularly suited

to the population of this study. As such, the study remains limited to fully capture career barriers of doctoral students. In response to this limitation, possible future research directions are proposed to investigate doctoral students' career barriers for the purpose of instrument development.

Finally, in terms of research design, this study contributed to the current literature on career choice processes by expanding theoretical understandings of career choice process from both socio-cognitive and contextual perspectives through theory convergence and mixed methods. The research design of this study may be used as a template by future researchers who are interested in integrating multiple research methods and multiple career theories into their research projects.

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Appendix A

IRB Approval

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Office of the Vice Chancellor for Research

Office for the Protection of Research Subjects
528 East Green Street
Suite 203
Champaign, IL 61820

April 5, 2016

Wen-Hao Huang
Ed Organization and Leadership
349 Education Bldg
1310 S Sixth St

Champaign, IL 61820

RE: *Understanding Doctoral Students' Career Decision-Making Processes: Comparing Faculty and Non-Faculty Careers*
IRB Protocol Number: 16741

Dear Dr. Huang:

Thank you for submitting the completed IRB application form for your project entitled *Understanding Doctoral Students' Career Decision-Making Processes: Comparing Faculty and Non-Faculty Careers*. Your project was assigned Institutional Review Board (IRB) Protocol Number 16741 and reviewed. It has been determined that the research activities described in this application meet the criteria for exemption at 45CFR46.101(b)(2).

This determination of exemption only applies to the research study as submitted. Please note that additional modifications to your project need to be submitted to the IRB for review and exemption determination or approval before the modifications are initiated.

Copies of the attached, date-stamped consent form(s) are to be used when obtaining informed consent. If there is a need to revise or alter the consent form(s), please submit the revised form(s) for IRB review, approval, and date-stamping prior to use.

Exempt protocols will be closed and archived five years from the date of approval. Researchers will be required to contact our office if the study will continue beyond five years. If an amendment is submitted once the study has been archived, researchers will need to submit a new application and obtain approval prior to implementing the change.

We appreciate your conscientious adherence to the requirements of human subjects research. If you have any questions about the IRB process, or if you need assistance at any time, please feel free to contact me at OPRS, or visit our website at http://oprs.research.illinois.edu

Sincerely,

Michelle Lore, MS
Human Subjects Research Specialist, Office for the Protection of Research Subjects

Attachment(s)

Appendix B

Email Invitations (Recruitment Letters)

B-1. Email Invitation for Online Survey (For Pilot Study)

Email Subject: Participate in Doctoral Student Career Survey

Dear [subject's name]

Hope you are enjoying your summer so far.

My name is Gaeun Seo and I am a doctoral candidate in the College of Education. I am currently working on my dissertation regarding doctoral students' experiences in making a post-graduation career choice. I'm reaching out to doctoral students who have spent more than 2 years in their doctoral programs.

I would like to understand your overall experiences making your career decision after graduation. Your participation will be extremely helpful to current and prospect doctoral students as I work to identify what career development assistance that doctoral programs can provide to meet doctoral students' career needs for pursuing career goals.

This survey should take approximately 15-20 minutes to complete. Would you be willing to meet with me in order to discuss your overall experiences in making your career choice?

Your participation will be strictly confidential. I will not share your identity or anything we discuss with anyone except my research team without your permission.

Please let me know if you are interested by replying to this email.

Your participation would be greatly appreciated! Please contact me via gseo4@illinois.edu if you have any questions. I would be happy to answer any additional questions that you have.

Sincerely,

Gaeun Seo
Doctoral Candidate | College of Education | University of Illinois at Urbana-Champaign
gseo4@illinois.edu

B-2. Email Invitation for Online Survey (For Full Study)

Email Subject: Participate in Doctoral Student Career Survey

Dear [subject's name]

Welcome back to the Fall 2016 semester!

I'm reaching out to doctoral students who recently passed prelim exam (Congratulations!). My name is Gaeun Seo and I am a doctoral candidate in the College of Education. I am currently working on my dissertation regarding doctoral students' experiences in making a postgraduation career choice.

I would like to understand your overall experiences making your postgraduation career choice. Your anonymous answers will be extremely helpful to current and prospect doctoral students as I work to identify what career development assistance that doctoral programs can provide to meet doctoral students' career needs for pursuing career goals.

This survey should take approximately 20-30 minutes to complete. Information about your rights as a participant in this research project can be found once you click the below survey link.

In appreciation for your time and input, you'll ***receive $10 Amazon gift card*** once you complete the survey. To begin the survey, please click the link below:
Survey Link here

Your participation would be greatly appreciated! Please contact me via gseo4@illinois.edu if you have any questions. I would be happy to answer any additional questions that you have.

Sincerely,

Gaeun Seo
Doctoral Candidate | College of Education | University of Illinois at Urbana-Champaign
gseo4@illinois.edu

B-3. Email Invitation for Interviews (For Pilot Study)

Email Subject: Interview for doctoral students' career choice

Dear [subject's name]

Hope you are enjoying your summer so far.

My name is Gaeun Seo and I am a doctoral candidate in the College of Education. I'm reaching out to doctoral students who have spent more than 2 years in their doctoral programs. I am currently working on my dissertation regarding doctoral students' experiences in making a postgraduation career decision.

As part of the dissertation, I would like to understand your overall experiences making your postgraduation career decision. Would you be willing to meet with me in order to discuss your overall experiences in making your career choice?

The interview would include a standard set of questions and would last 40 to 60 minutes, scheduled at a time of your choosing with several location options for you to choose from. In appreciation for your time, **you will be provided a $10 Amazon gift card** at the beginning of the interview. Your participation will be strictly confidential. I will not share your identity or anything we discuss with anyone except my research team without your permission.

Please let me know if you are interested by replying to this email. More information about the interview is provided below. I would be happy to answer any additional questions that you have.

Sincerely,

Gaeun Seo
Doctoral Candidate | College of Education | University of Illinois at Urbana-Champaign
gseo4@illinois.edu

B-4. Interview Confirmation Letter (Individuals who expressed interest in participating in interview from online surveys)

Email Subject: Interview Confirmation for Doctorates Career Study

Dear [subject's name]

My name is Gaeun Seo and I am a doctoral candidate in the College of Education. Thank you very much for offering me an opportunity to meet you and better understand how your postgraduation career choice is made!

The interview would include a standard set of questions and would last 40 to 60 minutes, scheduled at a time of your choosing with several location options for you to choose from. In appreciation for your time, **you will be provided a $20 Amazon gift card** at the beginning of the interview. Your participation will be strictly confidential. I will not share your identity or anything we discuss with anyone except my research team without your permission.

Please find the attached file for more information about the interview and let me know when is the best time for you to meet.

Sincerely,

Gaeun Seo
Doctoral Candidate | College of Education | University of Illinois at Urbana-Champaign
gseo4@illinois.edu

Appendix C

Voluntary Consent Forms

C-1. Participant's Consent Form for Online Survey

Participant's Consent Form for Online Survey

This project is designed to understand doctoral students' overall experiences making a career choice after graduation. Your participation is greatly appreciated.
This project consists of two parts.

1. Completing an online survey regarding your experiences related to career decision-making process. The survey takes approximately 10-12 minutes to complete. You will receive **$10 Amazon gift card** once you complete it.
2. At the end of the survey, you will be asked to whether you participate in the interview to further discuss your career experiences. You **will receive $20 Amazon gift card** if you participate in the interview.

Your anonymous answers will be aggregated and reviewed by a research team only after all identifying information is removed. No identifying information would be shared at any time. Data collected for this project will be stored on secure, password-protected computers, accessible only to the research team. At the conclusion of the project, these materials will be archived for a period of five years and then destroyed.
Participation in this research is not anticipated to create any risks greater than normal life.
Some findings may be used in publications and conference presentations aimed at helping other career services and doctoral programs to improve their programs and services for doctoral students to achieve their career pursuit. Identifying information will NOT be included in any dissemination of results.

Will my study-related information be kept confidential?
Yes, but not always. In general, we will not tell anyone any information about you. When this research is discussed or published, no one will know that you were in the study. However, laws and university rules might require us to disclose information about you. For example, if required by laws or University Policy, study information which identifies you and the consent form signed by you may be seen or copied by the following people or groups:

- The university committee and office that reviews and approves research studies, the Institutional Review Board (IRB) and Office for Protection of Research Subjects;
- University and state auditors, and Departments of the university responsible for oversight of research;

Please note, you must be at least 18 years of age to participate in this project.
Your participation in this project is completely voluntary, and you are free to withdraw at any time and for any reason without penalty. You are also free to refuse to answer any questions you do not wish to answer. Refusal to participate will not result in any negative impact on your current or future relationship with the University of Illinois at Urbana-Champaign.

If you have any questions or concerns, please contact Dr. Wen-Hao Huang, Associate Professor at the College of Education by email at wdhuang@illinois.edu. If you have any questions about your rights as a research participant, please contact Institutional Review Board at The University of Illinois at Urbana-Champaign, by telephone at 217-333-2670 or email at irb@illinois.edu.

Would you be willing to participate in this survey?

- ○ Yes, I am at least 18 years of age, and I am willing to participate in this project.
- ○ No, I am not at least 18 years of age, and/or I am not willing to participate in this project.

If YES, please complete the following (*This information will be only used to connect your answers if you request to remove your answers once you decide not to participate in the surveys anymore***):**

Net ID: _____

C-2. Interview Participant's Consent Form

Doctoral Student' Career Decision-Making Process
Interview Voluntary Informed Consent Letter

You are invited to participate in this project that is designed to understand doctoral students' overall experiences making a career choice after graduation. The letter is to invite you to participate in the one-to-one interview. Data gathered in this project will be used to provide career development guidelines to better meet career needs of current and future doctoral students. This project is being carried out by research team in the College of Education, under the leadership of the Associate Professor at Human Resource Development in the College of Education, Dr. Wen-Hao Huang. Your participation is greatly appreciated. ***Please note, you must be at least 18 years of age to participate in this project.***

What will I do?

You will be asked about your career-related experiences, especially how you made your postgraduation career choice. The interview will require approximately 40 to 60 minutes to complete, and will be scheduled at a time of your choosing. The interview will be conducted in the separate individual office room at a location of your choosing (The Career Center Interview Suite, Undergraduate Library, or ACES Library) to protect your privacy. The interviews will be audio recorded only with your permission, for transcription purposes only. If you would prefer, handwritten notes will record your interview responses instead. At the end of the interview, you are asked to complete a new brief demographic survey as part of the interview.

Your participation in this project is completely voluntary, and you are free to withdraw at any time and for any reason without penalty. You are also free to refuse to answer any questions you do not wish to answer. Refusal to participate will not result in any negative impact on your current or future relationship with the University of Illinois at Urbana-Champaign.

Will my study-related information be kept confidential?

Yes, but not always. In general, we will not tell anyone any information about you. When this research is discussed or published, no one will know that you were in the study. However, laws and university rules might require us to disclose information about you. For example, if required by laws or University Policy, study information which identifies you and the consent form signed by you may be seen or copied by the following people or groups:

- The university committee and office that reviews and approves research studies, the Institutional Review Board (IRB) and Office for Protection of Research Subjects;
- University and state auditors, and Departments of the university responsible for oversight of research;

The following steps will be taken by the research team to protect your confidentiality and privacy:

- The names and identities of all participants in the project will be kept confidential throughout the study.
- Any personally identifiable information collected during the interview (e.g., name and email address) will be kept in a separate location from other project files, and will be destroyed immediately following the completion of the data collection for this project.
- Data collected for this project will be stored on secure, password protected computers, accessible only to The Career Center's research team
- No participant will be identified in any notes, or report.
- All audiotapes will be destroyed after this project is completed.

- At the conclusion of the project, these materials except for audiotapes will be archived for a period of five years and then destroyed.

How will study information be used and shared?
Most immediately, findings from this study will be presented to one of research member (Gaeun Seo)'s dissertation committee members. Some findings may be used in publications and conference presentations aimed at helping other career services and doctoral programs to improve their programs and services for doctoral students to achieve their career pursuit. Identifying information will NOT be included in any dissemination of results.

What if I have questions?
If you have any questions or concerns, please contact Dr. Wen-Hao Huang, Associate Professor at the College of Education by email at wdhuang@illinois.edu. If you have any questions about your rights as a research participant, please contact Institutional Review Board at The University of Illinois at Urbana-Champaign, by telephone at 217-333-2670 or email at irb@illinois.edu.

Please indicate your willingness participate in this project below. You will receive a copy of this form for your records.

Would you be willing to participate in this interview?

- ○ Yes, I am at least 18 years of age, and I give permission to participate in this project described above.

- ○ No, I am not at least 18 years of age, and/or I am not willing to participate in this project.

Would you provide a permission to record your interview?.

- ○ Yes, I agree to allow my interview to be audio-recorded for the purposes of transcription only.
- ○ No, I don't agree to allow my interview to be audio-recorded for the purposes of transcription only.

_____
(Print) Name

_____ _____
Signature Date

Appendix D

Interview Guide for Participants

E-1. Interview Guide for Participants (For Pilot Study)

About the Interviews for Doctoral Students' Career Decision Process

The interviews will ask questions about your experiences making your postgraduation career choice, such as:

- Could you describe what is the your most desired career now (where do you want to be)?
- What events or factors influence your current primary career choice?
- Could you tell me what you like to do, what motivates you, and what you are particularly good at?
- What would be potential cost and benefits by choosing your primary career choice?
- In order to achieve your primary career choice, what is your plan for next step?
- Was there anything or any person made you ***easier/ harder*** to make your primary career choice?

Participation in this interview is completely voluntary. Your participation will also be confidential. Interviews will be conducted in closed-door rooms, either at The Career Center's Interview Suite or in private study rooms at the Undergraduate Library or the ACES Library. You may choose whatever location is most comfortable and convenient for you. Please note that library rooms will need to be reserved, and sometimes can be difficult to schedule in afternoons and evenings. We will do our best to accommodate your preferences.

At the beginning of the interview, I will ask for your permission to audio record the conversation. This is solely for my note-taking purposes. Audio recordings would be transcribed for the project and then immediately destroyed. Any personally identifying information would be removed from transcripts. If you are uncomfortable with the audio recording, it can be turned off at any time.

E-2. Interview Guide for Participants (For Full-Study)

About the Interviews for Doctoral Students' Career Decision Process

The interviews will ask questions about your experiences making your postgraduation career choice, such as:

- Could you describe what is the your most desired career now (where do you want to be)?
- What events or factors influence your current primary career choice?
- Could you tell me what you like to do, what motivates you, and what you are particularly good at?
- What would be potential cost and benefits by choosing your primary career choice?
- In order to achieve your primary career choice, what is your plan for next step?
- Was there anything or any person made you ***easier/ harder*** to make your primary career choice?

Participation in this interview is completely voluntary. Your participation will also be confidential. Interviews will be conducted in closed-door rooms, either at The Career Center's Interview Suite or in private study rooms at the Undergraduate Library or the ACES Library. You may choose whatever location is most comfortable and convenient for you. Please note that library rooms will need to be reserved, and sometimes can be difficult to schedule in afternoons and evenings. We will do our best to accommodate your preferences.

At the beginning of the interview, I will ask for your permission to audio record the conversation. This is solely for my note-taking purposes. Audio recordings would be transcribed for the project and then immediately destroyed. Any personally identifying information would be removed from transcripts. If you are uncomfortable with the audio recording, it can be turned off at any time.

Appendix E

Updated Interview Guide for the Researcher After Pilot Study

Interview Guide including Key Interview Questions

Interview Guide

The purpose of this project is to understand how doctoral students make a career decision. The questions listed below form the core of the interviews, with the research asking the participant to elaborate on their responses and provide specific examples. All interviews will be conducted in the following process, but will be adjusted to the particular setting and circumstances.

Interview Process

1. At the beginning of the interview, a participant will be asked to respond to three questions regarding his or her post-graduate career choice 1) before entering his or her doctoral program, 2) during their program, and 3) today. Based on his or her answers, the researcher will ask the interview questions, mainly focus on the career choice of today.

2. The interview will begin after the participant chooses his or her career choice of today. The participant will be asked to reflect their career choices while answering the interview questions.. During this process, the research will facilitate the conversation by providing probing and follow-up questions as well as examples.

Understand Your Career Choice(s)

Please think about 1) the time when you started your doctoral program, 2) the time when you were studying prior to your prelim exam, and 3) now today.

1. When you *started* your doctoral program, what career choice(s) were you thinking of pursuing? (Check All that apply)

- ☐ Faculty in a research institution
- ☐ Faculty in a teaching institution
- ☐ Researcher in a research institution
- ☐ Administrative (non-faculty paths in academia such as director in Academic Affairs)
- ☐ Non-profit organization
- ☐ Industry (Business sector)
- ☐ Government
- ☐ Not sure (haven't thought about it)
- ☐ Other 1 (please specify)
- ☐ Other 2 (please specify)

2. When you were studying in your doctoral program, what career choice(s) were you thinking of pursuing? (Check All that apply)

- ☐ Faculty in a research institution
- ☐ Faculty in a teaching institution
- ☐ Researcher in a research institution
- ☐ Administrative (non-faculty paths in academia such as director in Academic Affairs)
- ☐ Non-profit organization
- ☐ Industry (Business sector)
- ☐ Government
- ☐ Not sure (haven't thought about it)
- ☐ Other 1 (please specify)
- ☐ Other 2 (please specify)

3. How about career choices that you are thinking of pursuing TODAY? (Check All that apply, but please mark the primary career choice)

- ☐ Faculty in a research institution
- ☐ Faculty in a teaching institution
- ☐ Researcher in a research institution
- ☐ Administrative (non-faculty paths in academia such as director in Academic Affairs)
- ☐ Non-profit organization
- ☐ Industry (Business sector)
- ☐ Government
- ☐ Not sure (haven't thought about it)
- ☐ Other 1 (please specify)

☐ Other 2 (please specify)

4. When did you pass your prelim exam?

5. When do you plan to graduate?

(After answering the above three questions, a researcher will ask the below interview questions)

Thank you for your answers. Now, we are going to talk mainly about your **Today**'s career choice(s).

Introduction

1. Could you explain how and why your career choices have been changed throughout the doctoral program?
    a. (If the choice is consistent), could you explain why your primary career choice, _____ is consistent throughout the doctoral program?
2. (If a career decision has been made) Could you tell me how you made your primary career choice, _____? (What made you pursue _____?) or What is your career decision-making process?

Identifying career gap

You chose xxx (and xxx) as your primary career choice(s).

1. Could you more specifically describe where you want to be, name of your primary career choice and where you believe you are now (current status) in terms of your career after graduation (in terms of your career goals)?
2. (*If a participant can narrow down to one*) Did you have any life events or any turning points that made you decide to pursue your primary choice, _____?
    a. If so, could you share it with me?
3. (*If a participant still hasn't decided a specific career yet*) What events or factors caused you to open your career options?

Understanding knowledge of self (Interest, value, skills, and employment preferences) and options

Let's talk about your life and career now.

1. Could you tell me what you like to do or what you enjoy doing? / Could you tell me what you don't like to do?
2. Could you tell me what is important in your life?
3. Could you tell me what you are particularly good at?
4. Could you tell me 1) factors you seek in your career (e.g., flexible working time) and 2) factors you want to avoid in your career (e.g., three shifts)?
5. What information or knowledge do you have regarding your primary career choice, _____? (or what do you know about your primary career choice, _____?)
    a. How or where did you get/obtain that information/knowledge?
6. Prior to your primary career choice,_____, what career options had you explored?
7. In terms of your life, what are your other life roles such as being a son or daughter besides being a doctoral student?

8. We've talked about your interest, value, abilities, your employment preferences, and various roles that your have in your life. Could you tell me how you felt about this whole conversation? Any feelings or any thoughts?

Assessing myself and options and valuing career choices

1. Let's narrow it down to your primary career choice, _____. Now you know what kinds of knowledge you have about your primary career choice, _____. Also, we talked about your interest, values, and skills. From this whole conversation, do you find your primary career choice, _____ match your values, interest, skills, or employment preferences?
    a. If yes, could you describe how fit with your primary career choice, _____? (how it matches with your primary career choice,_____?)
    b. If not, could you explain more about that?
2. (*If the primary career choice is different from participant's previous choices*) I can see that your career choices have changed. I found your previous career choice was ___ and now _____. Could you tell me why you excluded other career options such as _____?
3. Now, we know why you choose your primary career choice, ____. Let's talk about cost and benefits by choosing this particular career choice. What would be potential cost and benefits by choosing your primary career choice, _____ and by excluding other career options?
    - Back-up questions keeping conversation active if a participant has a difficulty reflecting
        - How about the impacts of your values, interest, skills, and career preference?
        - Were they any influences of other people around you such as your significant others, parents, or children?
        - (If a participant has a role as a mother or father) How do you think you being a mother/ father influence your career choice?
        - **How about the influences of your previous experiences?**
        - Were they any external events (e.g., market situation-jobs available to apply or employment situation of your significant other) influencing your current career choice?
        - Were they any personal factors (e.g., marriage/child, health issue, Visa situation-International students) influencing your current career choice?

Executing my primary career choice

1. In order to achieve your primary career choice, _____, what is your plan for next step?
2. What have you done so far (to achieve your career choice) for that?
    a. Participating in workshops or programs?

b. Search available jobs?

c. Apply the positions?

Transition: e.g., You've done a lot. There are so many things to do!

Communicating to myself

1. How do you feel about your primary career choice, _____ while you are doing some activities (something they mentioned in the previous stage)?
2. How would you know that you made a good career choice? Let us think of your previous experiences in making a career choice. In past, how did you know that you made a good career choice?

Conclusion

Do you have anything that you want to add to what we have discussed?/ Is there anything you would like to add that I did not ask?

This concludes the open-ended questions of the interview. Thank you for spending your valuable time with me.

Appendix F

Updated Interview Coding Guide for the Study

Coding Categories Dictionary

CASVE Cycle[1] (*Coding categories dictionary is developed based on the basis of* ***Sampson et al.'s study (2004)***)

- **Introduction**

  This phase is not part of CASVE cycle, but was created to understand how each interview participant of the study reflected on how she or he made her or his current primary career choice without being asking any CASVE cycle-related questions. In this way, the study could better understand where the participants linger in their reflections more when they reflected on their career choice process.

- **Communication Phase (C): Knowing I Need to Make a Choice**
  - An individual becomes aware that she or he needs to make a career decision by receiving ***internal cues*** (e.g., anxiety) or ***external cues*** (e.g., the completion of a program, pressure from parents), which leads her or him to begin CASVE career decision-making process. *In this study, participants already decided their primary career paths. Thus, the major focus of this phase is 'what (either internal or external cues) made them decide to pursue their primary career path (either faculty or non-faculty career path)?'*
    - Influences of people (e.g., observing a faculty advisor), environmental factors (e.g., department atmosphere), or their own experiential learning (e.g., internship, teaching experience from a teaching assistantship) are related to all external cues
  - She or he becomes aware the gap exists between where she or he is (current status) and where she or he wants to be (desired status) regarding a career
    - ***The current status*** does not include done with prelim, qualifying exam, classes because all participants of the study are "all but dissertation" (ABD) status and these are tasks that they needed to complete before ABD
    - ***The desired career status*** can be anything related to a future career goal such as location, field, or institution she or he seeks for his or her career

- **Analysis Phase (A): Understanding Myself and My Options**
  - An individual identifies her or his ***self-knowledge*** including values, interest, skills, employment preferences, and personal of family situations
    - *Interest:* 1) Any activities or behaviors that she or he likes to do and 2) Any activities or behaviors that she or he enjoys doing
    - *Value*: 1) Something that motivates her or him and 2) something that is important to her or him
    - *Skill*: Any behaviors or activities that she or he is particularly good at

[1] For more information, please review Chapter 2.

        - *Employment Preferences*: 1) Factors that she or he seeks in her or his career (e.g., flexible working time) and 2) factors she or he wants to avoid her or his career (e.g., multiple shifts)
        - *Personal or Family Situations:* Factors that may influence her or his career choice (e.g., significant other, children)
    - She or he enhances her or his ***knowledge of options*** such as occupations or fields that she or he is interested in
        - If she or he is aware of the options available for her or him besides a primary career choice, it is also his or her option knowledge.
        - Under code of the option knowledge, a lack of knowledge on their choice is created as a sub-code
    - In this stage, dysfunctional thoughts (negative metacognitions) and stereotypes that inhibit a further exploration can be identified

- **Synthesis Phase (S): Considering Congruency between Myself and My Options (a Chosen Career)[2]**
    - (*If an interview participant has a consistent career choice throughout his or her program*) An individual identifies the ***level of congruence*** between their chosen primary career and knowledge gained in the analysis phase by assessing her or his "personal characteristics in relation to the nature of a chosen career that she or he is considering (***crystallization***)
    - (If an interview participant had different career choices or considered more than the current primary career choice ***before***) An individual identifies ***the level of incongruence*** between the previous career choices and knowledge gained in the analysis phase by assessing her or his "personal characteristics in relation to the nature of chosen careers that she or he was considering

- **Valuing (V): Evaluating a Chosen Primary Career Choice**
    - An individual evaluates the ***potential costs and benefits*** caused by pursuing a primary career choice not only to herself or himself but also to her or his significant others
    - This phase is not only to identify benefits and costs, but also finalize the primary career choice among the list of career options. If she or he indicate that there are list she/he wants to pursue, but decide to pursue one choice, that is the valuing phase

- **Execution (E): Implementing My Career Choice**
    - An individual develops ***an action plan*** and commit to it to achieve his or her career choice (e.g., participating in career preparation workshop, looking for employment opportunities to apply)
    - If the individual previously took action to achieve one or more career options (***implemented career activities***), his or her behaviors are considered as execution.

- **Communication (C2): Knowing I Made a Good Choice**
    - After completing the Execution phase, an individual returns to this phase to examine whether the identified gap has been effectively diminished or removed

[2] This study only focuses on the synthesis related to identifying the level of congruency between their chosen career path and knowledge gained in the analysis phase (defined as *crystallization*) since a primary career choice and/or previous career choice(s) will be identified before conducting interviews with participants. In short, expanding options will be not a major focus of this study. The original activities given the Synthesis phase can be found in the literature review section of this study.

- This study identified this phase by asking how an interview participant defines that he or she makes a good career choice based on his or her previous experience since this study cannot identify this phase. Thus, ***clear cues/unclear cues for a good career choice in communication2 phase are created***. In this way, this study can presume how each participant would know whether the gap is removed once he or she achieves his or her chosen career

Metacognitions: Individual's cognitive factors influencing the way she or he makes a career choice (can be negative or positive), which play a critical role in how individuals respond to career decision-making process. Such thoughts also influence how they perceive themselves and their current career options. Metacognitions consist of three dimensions as below:

- ***Self-talk:*** the silent discussion that individuals have with themselves regarding their previous, current, and future capabilities to perform a certain task. Positive self-talk encourages individuals while negative self-talk typically makes the career decision-making process more difficult
- **Self-awareness**: "the extent to which people are aware of themselves as they progress through the decision-making process" (Sampson et al., 2004, p. 24). This involves being aware of their thinking, emotions, and behaviors as well as the consequence of the interactions among them (e.g., how their self-talk might impact their career choice)
- ***Monitoring and control***: *Monitoring* refers to a person's ability to follow her or his progress through the career decision-making process. *Control* indicates a person's ability to be actively involved in the next proper career decision-making task. People with effective monitoring and control abilities can distinguish between the "knowing" and "doing" aspects during the career decision-making process and keep track of them

SCCT constructs that used in the study[3] (*Coding categories dictionary is developed based on the basis of* ***Lent et al., (1994)*** *and Swanson & Woike (1997))*

- **Self-efficacy:** individuals' beliefs concerning his or her capability to successfully perform a certain task or behavior. self-efficacy is mainly concerned about the concept of **can do** instead of will do. In this study, certain tasks or behaviors are considered career decision making related tasks or behaviors (e.g., belief in one's ability to identify career options that are relevant to his or her interest).
    - In this study, self-efficacy consists of positive and negative self-efficacy

- **Outcome expectations**: Individuals' beliefs in obtaining career outcomes of performing particular behaviors. (e.g., attending a job search workshop will enhance my skills that can help find relevant jobs)
    - In this study, outcome expectations consist of positive and negative outcome expectations

- **Career barriers**: Situations (either within the person or in his or her environment) that hinder career progress (e.g., a lack of encouragement from significant others to pursue a certain career)
    - In order to capture the influence of faculty advisors, "faculty barriers" was created

[3] For more information, please review Chapter 2.

- **Environmental supports:** Environmental activities, conditions, or resources that facilitate career progress (e.g., helps from a faculty advisor to build skills that are critical to achieve a career goal)
    - In order to capture the influence of faculty advisors, "faculty support" was created

Other: a theme or domain does not belong to the constructs provided by theories (other emerging theme/ domain)

References

Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance [Monograph]. Journal of Vocational Behavior, 45(1), 79–122. doi:10.1006/jvbe.1994.1027.

Sampson, J. P., Jr., Reardon, R. C., Peterson, G. W., & Lenz, J. G. (2004). *Career counseling and services: A cognitive information processing approach*. Pacific Grove, CA: Brooks/Cole.

Swanson, J. L., Woitke, M. B. (1997). Theory into practice in career assessment for women: Assessment and interventions regarding perceived career barriers. Journal of Career Assessment, 5(4), 443-462. doi: 10.1177/106907279700500405.

Analysis Worksheet

Interviewee ID: _____ Coding Date: _____

Analysis 1. CASVE Cycle

A. Communication (C)		**B. Analysis**		**C. Synthesis**	
C- 1	Quotes, descriptions (transcription page __)	A- 1	Quotes, descriptions (transcription page __)	S- 1	Quotes, descriptions (transcription page __)
C- 2	Quotes, descriptions (transcription page __)	A- 2	Quotes, descriptions (transcription page __)	S- 2	Quotes, descriptions (transcription page __)
C- 3	Quotes, descriptions (transcription page __)	A- 3	Quotes, descriptions (transcription page __)	S- 3	Quotes, descriptions (transcription page __)
C- 4	Quotes, descriptions (transcription page __)	A- 4	Quotes, descriptions (transcription page __)	S- 4	Quotes, descriptions (transcription page __)
D. Valuing		**E. Execution**		**F. Communication (C2)**	
V- 1	Quotes, descriptions (transcription page __)	E- 1	Quotes, descriptions (transcription page __)	C2- 1	Quotes, descriptions (transcription page __)
V- 2	Quotes, descriptions (transcription page __)	E- 2	Quotes, descriptions (transcription page __)	C2- 2	Quotes, descriptions (transcription page __)
V- 3	Quotes, descriptions (transcription page __)	E- 3	Quotes, descriptions (transcription page __)	C2- 3	Quotes, descriptions (transcription page __)
V- 4	Quotes, descriptions (transcription page __)	E- 4	Quotes, descriptions (transcription page __)	C2- 4	Quotes, descriptions (transcription page __)

* Please copy a part of data that represents a certain phase of CASVE cycle *(can occur at the level of word, phrase, sentence, or paragraph)* and paste it to one of CASVE Cycle

Note:

Analysis 2. Analyzing Each Phase

: This analysis stage will code the data you identified from the previous analysis stage to understand each phase of CASVE cycle for close examination.

A. Introduction (I): Participant-led Career Decision-Making Process

* Please copy and paste the part that you believe to be related and briefly describe how what you find is related to a section you choose

Code No.	Identified data from Communication phase	Communication	Analysis	Synthesis	Valuing	Execution	Communication2
I-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)	Quotes, descriptions (*type of internal cue if you find*)	Quotes, descriptions (*where she or he is now if you find*)	Quotes, descriptions (*where she or he desires to be if you find*)	Quotes, descriptions (*Theme that does not belong to existing categories if you find*)	Quotes, descriptions (*Theme that does not belong to existing categories if you find*)
I-2							
I-n…							

Identified influences of metacognition/emotions from the analyzed above segments if found (optional)

Code No.	Identified data from Introduction	**Identified type of metacognition** (e.g., self-talk, self-awareness)
I-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
I-n		

Note:

- List of the metacognitions or emotions that you find from the interviewee____
- List of the other themes which are not categorized into the existing coding categories

Note:

B. Communication(C): Knowing that a choice needs to be made

* Please copy and paste the part that you believe to be related and briefly describe how what you find is related to a section you choose

Code No.	Identified data from Communication phase	External Cue	Internal Cue	Current Status	Desired Career Status	Other (e.g., other theme)
C-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)	Quotes, descriptions (*type of internal cue if you find*)	Quotes, descriptions (*where she or he is now if you find*)	Quotes, descriptions (*where she or he desires to be if you find*)	Quotes, descriptions (*Theme that does not belong to existing categories if you find*)
C-2						
C-n…						

Identified influences of metacognition/emotions from the analyzed above segments if found (optional)

Code No.	Identified data from Communication phase	**Identified type of metacognition** (e.g., self-talk, self-awareness)
C-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
C-n		

Note:

Summary of data analysis

- List the **external cues** that you find from the Interviewee ___
- List the **internal cues** that you find from the Interviewee ___
- Identified career gap

Current Status	Desired Status

- List of the metacognitions or emotions that you find from the interviewee____
- List of the other themes which are not categorized into the existing coding categories

Note:

C. Analysis (A): Understanding Myself and My Options

* Please copy and paste the part that you believe to be related and briefly describe how what you find is related to a section you choose

C-1. Self-Knowledge

Code No.	Identified data from Analysis phase	Self-Knowledge					
		Interest	**Skills**	**Value**	**Employment Preference**	**Personal or Family Situation**	**Other**
A-1	Quotes (Transcription page __)	Quotes, descriptions (*type of interest if you find*)	Quotes, descriptions (*type of skills if you find*)	Quotes, descriptions (*types of value if you find*)	Quotes, descriptions (*types of employment preferences if you find*)	Quotes, descriptions (Any *personal or family situation if you find*)	Quotes, descriptions (*Theme that does not belong to existing categories if you find*)
A-2							
A-n							

Note:

C-2. Option Knowledge of career choices

Code No.	Identified data from Analysis phase	Option Knowledge
A-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
A-n		

Note:

C-3. Prejudice regarding self or options if found (optional)

Code No.	Identified data from Analysis phase	Prejudice	
		Self	**Career Options**
A-1	Quotes (Transcription page __)	Quotes, descriptions (*type of interest if you find*)	Quotes, descriptions (*type of skills if you find*)
A-2			

Note:

C-4. Identified influences of metacognition/emotions from the analyzed above segments if found (optional)

Code No.	Identified data from Analysis phase	**Identified type of metacognition** (e.g., self-talk, self-awareness)
A-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
A-n		

Note:

Summary of data analysis

- List the **interests** that you find from the Interviewee ___
- List the **skills** that you find from the Interviewee ___
- List the **values** that you find from the Interviewee ___
- List the **employment preferences** that you find from the Interviewee ___
- List the **personal or family situations** that you find from the Interviewee ___
- List the **option knowledge** that you find from the Interviewee ___
- List of the metacognitions or emotions that you find from the interviewee____
- List of the other themes which are not categorized into the existing coding categories

Note:

D. Synthesis (S): Considering Congruency between Myself and My Options (a Chosen Career)
* Please copy and paste the part that you believe to be related and briefly describe how what you find is related to a section you choose

D-1. Congruence between a primary career choice and knowledge gained in the analysis phase *(if a career choice was consistent)*

Code No.	Identified data from Synthesis phase	Influential factors to determine the congruence between a primary career choice and knowledge gained in the analysis phase
S-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
S-n		

Note:

D-2. Incongruence between a primary career choice and knowledge gained in the analysis phase (*if a primary career choice was different from the previous career choice(s)*)

Code No.	Identified data from Synthesis phase	Influential factors to determine the incongruence between other career choice(s) and knowledge gained in the analysis phase
S-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
S-n		

Note:

D-3. Identified influences of metacognition/emotions from the analyzed above segments if found (optional)

Code No.	Identified data from Communication phase	**Identified type of metacognition** (e.g., self-talk, self-awareness)
C-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
C-n		

Note:

D-4. Others that are Not Categorized into the Existing Coding Categories

Code No.	Identified data from Communication phase	Others
E-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
E-n		

Note:

Summary of data analysis

- List the **perceived the congruence** from the Interviewee ___
- List the **perceived incongruence** from the Interviewee ___
- List of the metacognitions or emotions that you find from the interviewee____
- List of the other themes which are not categorized into the existing coding categories

Note:

E. Valuing (V): Evaluating a Chosen Primary Career Choice

* Please copy and paste the part that you believe to be related and briefly describe how what you find is related to a section you choose

Note:

E-1. Costs of Choosing a Primary Career Choice

Code No.	Identified data from Analysis phase	Costs	
		Self	**Other people (e.g., significant others)**
V-1	Quotes (Transcription page __)	Quotes, descriptions (*type of interest if you find*)	Quotes, descriptions (*type of skills if you find*)
V-2			

E-2. Benefits of Choosing a Primary Career Choice

Code No.	Identified data from Analysis phase	Benefits	
		Self	**Other people (e.g., significant others)**
V-1	Quotes (Transcription page __)	Quotes, descriptions (*type of interest if you find*)	Quotes, descriptions (*type of skills if you find*)
V-2			

Note:

E-3. Identified influences of metacognition/emotions from the analyzed above segments if found (optional)

Code No.	Identified data from Communication phase	**Identified type of metacognition** (e.g., self-talk, self-awareness)
D-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
D-n		

Note:

E-4. Others that are Not Categorized into the Existing Coding Categories

Code No.	Identified data from Communication phase	Others
E-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
E-n		

Note:

Summary of data analysis

- List the **costs** that you find from the Interviewee ___
    - Self
    - Significant others
- List the **benefits** that you find from the Interviewee ___
    - Self
    - Significant others
- List of the metacognitions or emotions that you find from the interviewee____
- List of the other themes which are not categorized into the existing coding categories

Note:

F. Execution (E): Implementing My Career Choice

F-1. Action Plan to Achieve a Primary Career Choice

Code No.	Identified data from Synthesis phase	Activities that an participant *plans* to commit in order to achieve a primary career choice
E-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
E-n		

* Please copy and paste the part that you believe to be related and briefly describe how what you find is related to a section you choose
Note:

F-2. Implemented Activities to Achieve a Primary Career Choice

Code No.	Identified data from Synthesis phase	Activities that an participant already implemented to achieve a primary career choice
E-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
E-n		

* Please copy and paste the part that you believe to be related and briefly describe how what you find is related to a section you choose
Note

F-3. Identified influences of metacognition/emotions from the analyzed above segments if found (optional)

Code No.	Identified data from Communication phase	Identified type of metacognition (e.g., self-talk, self-awareness)
E-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
E-n		

Note:

F-4. Others that are Not Categorized into the Existing Coding Categories

Code No.	Identified data from Communication phase	Others
E-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
E-n		

Note:

Summary of data analysis

- List the **activities** that the interviewee___ plans to implement to achieve a primary career choice
- List the **activities** that the interviewee___ already implemented to achieve a primary career choice
- List of the metacognitions or emotions that you find from the interviewee____
- List of the other themes which are not categorized into the existing coding categories

Note:

G. Communication (C2): Knowing I Made a Good Career Choice

* Please copy and paste the part that you believe to be related and briefly describe how what you find is related to a section you choose

G-1. Criteria to Determine that an Interviewee Makes a Good Career Choice

Code No.	Identified data from Synthesis phase	Criteria to determine a good career choice made
S-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
S-n		

Note:

G-2. Identified influences of metacognition/emotions from the analyzed above segments if found (optional)

Code No.	Identified data from Communication phase	**Identified type of metacognition** (e.g., self-talk, self-awareness)
F-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
F-n		

Note:

G-3. Others that are Not Categorized into the Existing Coding Categories

Code No.	Identified data from Communication phase	Others
E-1	Quotes (transcription page __)	Quotes, descriptions (*type of external cue if you find*)
E-n		

Note:

Summary of data analysis

- List the **criteria** to determine a good career choice implement to achieve a primary career choice
- List of the metacognitions or emotions that you find from the interviewee____
- List of the other themes which are not categorized into the existing coding categories

Note:

A Joint Matrix

Dimension: Quantitative Themes: SCCT core constructs examined

Dimension: Qualitative Responses (CASVE cycle)

Qualitative Categories CASVE cycle		**Quantitative Themes (SCCT Core Constructs)**				
Participant ID	**Phase of CASVE cycle**	**Career Barriers**	**Environmental Supports**	**Self-efficacy**	**Outcome Expectations**	**Other**
Participant -1 (P-1)	Communication-1 (C-1)	Quotes, descriptions (*type of barriers if you find*)	Quotes, descriptions (*type of supports if you find*)	Quotes, descriptions (*types of self-efficacy if you find*)	Quotes, descriptions (*types of outcome expectations if you find*)	Quotes, descriptions (*Theme that does not belong to existing categories if you find*)
P1	C-2					
P2…	C-1…					
P1	A-1					
P1..	A-2..					
P1	S-1					
P2	S-1…					
P1	V-1					
P1	V-2…					
P1	E-1					
P2	E-1					
P3	E-1…					

Appendix G

Sample Summary Interview Note Used to Identify Emerging Themes

Introduction

Selected Participants of the Faculty Career Path Group

Ann (Female, Art Education/Social Science and Humanities, International student, single, and faculty in a research institution)

She realized the limited options after ABD (**Analysis, option knowledge**). Her mother was a professor in Taiwan. Observing her mother's work such as making changes and flexible working life style influenced her to pursue a faculty career (**Analysis, family situation & Communication, external cue**). Further, she started conducting a research since her undergraduate program and her undergraduate faculty advised her to pursue PhD right away if she was interested in staying in academia (**Analysis, family situation/option knowledge**). Overall, observing faculty life through her mother and her undergraduate professors influenced her to consider being a faculty (**Communication, external cue**).

→ Communication, Analysis Phases

Ariel (Female, Psychology/ Social Science and Humanities, domestic student, single, and faculty in a teaching institution)

Although she was aware of other possible options for her (**Analysis, option knowledge**), she wanted to pursue a faculty career, especially in a teaching institution. Through her teaching experience during her PhD program, she liked teaching (**Analysis, Interest**), which made her realize that she wanted to pursue her career as a faculty, especially in a teaching institution

(**Communication, External cue**). Also, she has an interest in continuing her research as well (**Analysis, interest**). She prefers to teach in university setting and want some place where she can do research at the same time (**Analysis, employment preference**). She believes becoming a faculty in a teaching institution would allow her to teach young people in a university setting and mentoring them as well as to continue her research (**Synthesis, Congruence with interest and employment preference**). That is why she decided to pursue her career in academia as a faculty in a teaching institution.

→ Communication, Analysis, & Synthesis Phases

Ritu (Female, Mechanical Engineering/Science and Engineering, domestic, single, and faculty in a research university)

She was aware of other possible options including more about what faculty does. During her PhD, she learned that faculty in a research institution do a lot of research in addition to teaching (**Analysis, option knowledge**), which made her rethink about a faculty career (**Communication, External cue**). Since she believed that she was good at research (**Analysis, skills**), she decided to pursue her career as a faculty a research institution (**Synthesis, Congruence with skills**). She believed that the training that she received from PhD program made her well-prepared to become a faculty, so she was confident that she would do a good job (**Metacognition, positive self-talk).**

→ Communication, **Analysis**, Synthesis, Metacognition

Selected Participants of the Non-Faculty Career Path Group

Alfonso (Male, Civil Engineering/Science and Engineering, International, single, industry)

He always wanted to go back to practice because he came to PhD to learn more about knowledge that he wanted to use for industry (**Communication, internal cue**). He liked something more practical and applied rather than doing academic research (**Analysis, interest**) and enjoyed working with team (**Analysis, interest**) and like the idea of creating something tangible (**Analysis, value**). Also, if he works for industry, he can earn more money than the academia (**Analysis, value**). He used the process of elimination by comparing his value, interest, and skills with the characteristics of each career option that he knew (**Synthesis, incongruence and congruence**).

→ Communication, **Analysis**, Synthesis Phases

Allison (Female, RST/ Social Science and Humanities, domestic, married with a child, and administrative position)

Although her original career plan was to become a faculty in a research institution, she reconsidered her choice as she experienced her doctoral program because she perceived that amount of workload she had to do during her program was too much for her and realized that she could not only focus on research even though she became a faculty due to a lot of different responsibilities (**Communication, External Cue**). Also, she did not have a strong passion for teaching (**Analysis, interest**). Besides that, she had a full-time job while working her program (**Analysis, personal situation**), it was too much to balance it. She did not want to live her current life like now like her current situation, working all day and doing her research at night even when she becomes a faculty (**Analysis, Employment Preference**). She knew that it is not common to go to government, industry, and non-profit in her field (**Analysis, option knowledge**). Considering her background in student

affairs (**Analysis, personal situation**), she knew how things work and what options available in Student Affairs, so she started to consider that option (**Analysis, option knowledge**). Through a part of elimination process by considering her interest, and employment preference, and possible options in her field, she believed that an administrative position is the most feasible for her in her field (**Synthesis, congruence and incongruence**).

→ Communication, **analysis**, synthesis Phases

Bene (Female, French/Social Science and Humanities, international, married, administrative)

She learned that she felt a lot of stress when she wrote. She "hates" writing (**Analysis, interest**), so she did not want to pursue her career that requires a lot of writing and publication (**Synthesis, incongruence with her interest**). Before married, her husband was away from her because of his job (**post-doc**). After then, she and her husband decided not to live separately (**Analysis, personal situation**) and decided not to pursue faculty careers because she saw many people could not live together due to their faculty career pursuits (**Communication, External cue**). Lastly, she knew that it is so hard to get a tenure-track faculty position (**Analysis, option knowledge**). She likes to doing tasks that has beginning and an end and wants weekends to enjoy her personal time (**Analysis, employment preference**). Considering her preference, she believe that office job would be the best for her (**Synthesis, congruence**). She also knew that she did not want to do research (Analysis, interest). She still wants to stay in a university because she believed that education makes an impact on people's life (**Analysis, value**).

→ Communication, **Analysis**, Synthesis Phases